Owner's Manual

LEVIASYNTH

DESKTOP

Polytouch®

ASM

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MANUAL

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www.AshunSoundMachines.com

IMPORTANT SAFETY INSTRUCTIONS

SAVE YOUR EARS!

The product and its software, when used in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level or at a level that is uncomfortable.

If you encounter any hearing loss or ringing in the ears, please consult an audiologist.

PRECAUTIONS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. Read and understand all the instructions.
2. Always follow the instructions on the instrument.
3. Before cleaning the device, always remove the USB and DC cable. When cleaning, use a soft and dry cloth. Do not use gasoline, alcohol, acetone, turpentine or any other organic solutions; do not use a liquid cleaner, spray or cloth that's too wet.
4. Do not use the device near water or moisture, such as a bathtub, sink, swimming pool or similar place.
5. Do not place the device in an unstable position where it might accidentally fall over.
6. Do not place heavy objects on the device. Do not block openings or vents of the device; these locations are used for air circulation to prevent the device from overheating. Do not place the device near a heat vent at any location with poor air circulation.
7. Do not open or insert anything into the device that may cause a fire or electrical shock.
8. Do not spill any kind of liquid onto the device.
9. Always take the device to a qualified service center. You will invalidate your warranty if you open and remove the cover, and improper assembly may cause electrical shock or other malfunctions.
10. Do not use the device with thunder and lightning present; it may cause electrical shock.
11. Do not expose the device to direct sunlight or extreme temperatures.
12. Do not use the device when there is a gas leak nearby.
13. Ashun Sound Machines is not responsible for any damage or data loss caused by improper operation of the device.

SPECIFICATIONS SUBJECT TO CHANGE

The information contained in this manual is believed to be correct at the time of printing. However, Ashun Sound Machines reserves the right to change or modify any of the specifications without notice or obligation to update the hardware that has been purchased.

BEFORE REQUESTING SERVICE...

Please study this manual carefully and consult your dealer before requesting service. Service charges incurred due to a lack of knowledge relating to how a function or feature works (when the product is operating as designed) are not covered by the manufacturer's warranty, and are therefore the owner's responsibility.

CONTENTS

WELCOME TO LEVIASYNTH!

Everyone at Ashun Sound Machines would like to thank you for choosing one of our cutting-edge Leviasynth synthesizers. We're very proud of these instruments, and are confident they will help you delve the depths of your creativity in ways you never thought possible.

Every aspect of these innovative devices has been carefully considered, from the way the sounds are generated and processed, to the intuitive layout of the controls and the contents of the display. Everything from impulse to performance has been optimized to unleash the creative potential of these instruments in your hands.

MAIN FEATURES

This chapter will only list the main features of the Leviasynth desktop. But there are many more, and each feature and its related parameters are described in the pages ahead. Advanced users might find quick answers to important questions in *Leviasynth Specifications (p. 173)*.

User interface

- 4.3 inch, touch-responsive, high-resolution display for data entry and parameter information
- Dozens of top-panel controls for instant access to important features
- 8 Control knobs positioned above and below the display
  - 8 soft buttons located within the display on the Home page
- LED rings around the Control knobs indicate parameter values
- 8 assignable Macros per patch, accessible on the Home page (16 in Multi mode)
- OSC Env Level & Bias controls for quick, easy patch editing
  - Touch-sensitive Bias knobs let you read values without changing them
- View and edit multiple parameters for one oscillator, or one parameter for all 8 oscillators
- Easy shortcuts for patch / mod route construction (connect / copy / paste)
- Transport buttons and 7 onscreen Sequencer buttons for quick selection, editing, recording and playback of sequences
- Switch instantly between Single / Multi modes with dedicated buttons
- Browse Multi or Single patches by Name or Number, then filter patches by Bank, Category, and / or Sound Designer
- Memorize / instantly recall an unlimited number of Favorites (Multis and Singles)
  - A dedicated Favorite button takes you straight to the patches that inspire you most.
- Dedicated MIDI button for easy access to essential settings

Patch features

- 8 banks of 128 patches each (Single mode)
- Over 300 waveforms
- Independent synthesis modes per oscillator: Phase Mod, Freq Mod, PW Mod, HTE Sync, and 3 types of Phase Distortion
- Bit-reduction of oscillator waveforms, LFOs, Envelopes, or the entire patch
- Select one of over 140 preset algorithms, or create one. Each patch can have its own.
- Mono, Unison, and Unison Poly voice modes, with unison detune
- Glide and glissando with time / distance options, programmable trigger mode, curve
- Preset scales with microtonal options and the ability to import custom scales
- Independent Chord mode settings per patch
- Independent Octave button settings per patch (Single mode only)
- Mod Matrix with 32 routes per patch
- Optional Analog Feel emulates the behavior of analog circuits throughout the signal path
- VoiceMod feature can introduce per-voice variation and modulation
- Multiple panning options with adjustable stereo width
- Stereo Osc mode
- Randomize function for individual parameters, modules, a single patch, or an entire Multi
- Use Single mode patches in a Multi; edit & save without changing the original patch
- Dedicated Multi section, with Upper / Lower selection buttons and Balance control
- 5 banks of 128 Multis
- Each Multi holds two independent patches (i.e., parts) for an additional 1,280 patches

- Edit Upper / Lower part parameters together or independently
- Dual or KeySplit modes
  - Independent octave ranges and levels for Upper and Lower parts
  - Sustain pedal, wheels, and ribbon can control Upper, Lower, or Both
  - Macros can control Upper, Lower, or Both; access up to 16 Macros per Multi
  - Dual mode: Definable velocity switch point with adjustable crossfade
  - KeySplit mode: Definable split point with adjustable crossfade

Sound engine

- 16 voices, with up to eight oscillators per voice
  - Single mode: One 16-voice patch
  - Multi mode: layer or split two independent 8-voice patches
- Over 300 waveforms
- Selectable synthesis modes per oscillator: Phase Mod, Freq Mod, PW Mod, HTE Sync, and three types of Phase Distortion
- Three oscillator Pitch modes: Semitone, Ratio, and Frequency
- Select one of over 140 preset algorithms, or create one. Each patch can have its own.
  - Morph between algorithms
  - Any Oscillator can modulate any Oscillator
  - Flexible algorithms: Oscillators can be a carrier, a modulator, or both at once.
- Filter 1 (Digital): 18 types, including...
  - 2 morphing multimode 12dB / octave filters (HP / BP / LP, HP / Notch / LP)
  - 15 variations of HP, LP, and BP filters ranging from subtle to steep
  - Our famous vowel formant filter
- Filter 2 (Analog): 4-pole filter with pre-filter overdrive, can self-oscillate
- Loopable ADSR envelopes with Delay and Hold stages, definable loop points
- Curve and BPM value for each segment
- Each envelope can have up to 4 trigger sources
- Optional Slow settings for extremely long Envelopes and super slow LFOs
- Vintage mode for authentic recreation of your favorite digital sounds from the '80s.
- Overflow mode can link two units for up to 32-voice polyphony (Single mode only)

Arpeggiator & Sequencer

- Shared features
  - Tap Tempo (controlled by soft button on SEQ EDIT page)
  - Configurable metronome, routable to master output + phones or headphones only
  - Tap Trigger to advance Arpeggio
  - Swing range 25-75%
  - Arp & Sequencer parameters can be mod destinations via Mod Matrix
  - Convert Arpeggios into Sequence Tracks and vice-versa, then edit or adjust with the features of that mode
- Arpeggiator:
  - 8 modes with direction, octave, chord, and phrase options
  - Ratchet, Chance, and Entropy variations for generating interesting patterns
  - Definable Arp length
  - 64 preset phrases, 64 user phrases
- Sequencer:
  - 2 polyphonic note data tracks and 1 Macro track per patch
    - Each note track can record pitch bend, mod wheel, and polyphonic aftertouch
    - Macro track has 8 lanes of parameter automation (one per Macro)
    - Selectable play modes: Parallel (all at once) or Series (one note track + Macro track)
  - Record in real time or step mode
  - Independent length and playback modes per track
  - Each Track can be routed to the internal sound engine, an external device (MIDI or CV), or both
  - Tracks can record incoming MIDI
  - Tracks can be muted / unmuted independently
  - Up to 128 steps per track
    - Definable MultiTrig, Drift, and Probability, per step, per track
  - Tap Rhythm to transform a track into a different rhythm
  - Track shift, transpose, conform to scale
  - Random generation of step content and shuffling of step order

Effects

- Delay: five types, including Left-Right-Center and reverse
  - All delays can sync to tempo
- Reverb: four types, with pre-delay and damping parameters
  - Reverb lengths to 90 seconds, plus “Freeze”
- Independent Pre / Post FX: Chorus, Flanger, Rotary, Phaser, Lo-Fi, Tremolo, EQ, Compressor, Distortion
- Global bypass of any or all FX modules
- Effects can be independent or shared between Upper / Lower parts in Multi mode

ASM Manager

Use our free ASM Manager app to

- Organize patches inside a bank and transfer them between banks
- Change the patch order inside the Favorites list to accommodate changes to your live set
- Import / export, backup, and restore the patches, sequences, arpeggiator phrases, & favorites

ASM Manager is available for free on our website: *https://www.ashunsoundmachines.com/downloads.*

Hardware

- 16 velocity-sensitive RGB pads with polyphonic pressure
- Selectable Pad modes
  - Play mode (with selectable scales)
  - Sequencer step entry mode
- Pad colors indicate status in each mode
- Octave Down / Up buttons
- Chord mode with dedicated button
- Glide button
- LED Brightness controls for darkened rooms
- USB type B port, class-compliant
- MIDI In / Out / Thru
- CV / Gate inputs and outputs for integration with modular synthesizers
- Two 1/4” outputs (balanced)
- Headphone output
- Rack-mountable (ears included)
- Recessed connection jacks allow for straight connectors
- Sustain pedal input (polarity-sensing)
- Assignable Expression pedal input (reversible)
- Kensington lock port
- Ready for VESA 75mm X 75mm mounting bracket (optional)
- ...and legendary build quality.

INSIDE THE BOX

Your Leviasynth desktop was carefully packed at the factory with the following items:

- The Leviasynth desktop
- This manual
- The power supply (12VDC / ≥2A)

Save Your Receipt!

Ashun Sound Machines designed and constructed your Leviasynth with extreme attention to detail. Our quality assurance personnel test each unit thoroughly before it goes out.

But in the unlikely event of a hardware problem, you will need to present your original receipt in order to obtain warranty service. This will help the service center to confirm your warranty coverage. So please be sure to save your receipt in a safe location!

ATTACHING THE RACK EARS

We've included rack ears with the Leviasynth desktop so you can put it into a rack if you prefer. It's easy to attach them:

1. Undo the 3 screws on each of the side panels and store the panels in a safe place.
2. Put one of the rack ears on the appropriate side of the unit.
3. Use the screws you removed to attach it.
4. Repeat the process for the other side.

PLUG IT IN

Power

Use only the DC power supply that was in the box with your Leviasynth (12 Volts DC, ≥2 Amp). Make sure the power switch is in the OFF position before making this connection.

Before switching the unit on, please lower the volume of your speakers or mute the input channels on your mixer. This will help prevent any damage to your speakers or ears.

Audio

USING A MIXER OR AUDIO INTERFACE

After muting the channel inputs or lowering the volume of your speakers, connect a pair of 1/4" cables from the L/R output jacks on the rear panel of the Leviasynth to the inputs of your mixer or audio interface. Then set the Leviasynth power switch to the ON position.

Note: The USB connection is not an audio output.

USING HEADPHONES

If you plan to connect headphones to the Phone jack on the Leviasynth, turn the unit on first and then connect the headphones. The headphone level is controlled by the Master Volume knob on the top panel.

MASTER VOLUME CONTROL

The Master Volume knob controls the main outputs and headphone level on Leviasynth. It's an analog control, which means it does not communicate its position or movements digitally via USB or MIDI.

But Master Volume does respond to MIDI CC #7 via USB and MIDI. So if you are using Leviasynth with a computer, for example, remember that you'll need to adjust its level using a MIDI track in your DAW.

USB

Leviasynth is a USB class-compliant device, so there are no drivers to install. Just plug it into your computer and it will be available immediately as a MIDI input / output device.

MIDI

Leviasynth has three 5-pin MIDI connectors to allow you to interface with other MIDI devices. MIDI Out sends data from Leviasynth, MIDI In receives data, and MIDI Thru passes data from the MIDI In without data from Leviasynth.

CV/GATE

Your Leviasynth has a row of connectors that are used to interface with modular synthesizers. Each one can be configured to match the voltages and signal types of the most popular formats. For details, see *The CV / Gate Section (p. 148)*.

Make Some Noise!

By now you've already played the instrument and tweaked the controls. Now let's take a quick tour of some of the main features.

To get started, press the [SINGLE] button (under the Master Volume knob). This will exit any page and take Leviasynth to the top level of the current Single mode patch. We'll explore Multi mode later.

You can always use the Home button to jump to the top level of the current mode (Single or Multi).

SELECT PATCHES

There are several ways to explore the patch banks in Single mode. The simplest way is to turn the Patch knob (the big one in the middle), or use the left and right arrow buttons above the Home button. This will move you through the bank one patch at a time. You'll see the patch name, bank, number, and category in the display.

You can also hold [SHIFT] and turn the Patch knob to jump between the banks. This can save a lot of scrolling if you know the location of the patch you're looking for.

The Browse button opens the patch browser in the display. You'll want to read the section *Using the Browser (p. 140)* to learn about things like Categories, Favorites, and other search techniques.

OCTAVE SHIFT

If you want to play a sound in a higher or lower range than the pads currently reach, you can shift the range quickly by one or more octaves. The Leviasynth desktop has dedicated buttons in the left corner that flash faster as the range moves further from center; at maximum shift the buttons are lit solid. To reset the range, press both buttons.

In Single mode the Octave shift setting is saved with the patch. In Multi mode the Octave shift setting is not saved with the patch, and is reset to zero when a new Multi is selected. However, you can change the octave settings of the patches inside the Multi and save the Multi that way. Those details are in the chapter about *Multi Mode (p. 129)*.

There are words in cyan letters under some of the buttons. These are used with the [SHIFT] button to access their secondary functions. We'll describe those in the appropriate chapters.

ARPEGGIATOR & SEQUENCER

Leviasynth's Arpeggiator and Sequencer are a potent combination. Each is powerful in its own right, but together they can help your music reach a new dimension! Each can process data from the other, which provides a level of integration and interoperability that is unprecedented in a musical device.

In this chapter we'll provide a basic description of each, as well as a hint of the capabilities when they work together. There are dedicated chapters with the full details: *The Arpeggiator Section (p. 99)* and *Sequencer (p. 105)*.

ARPEGGIATOR BASICS

Arpeggiators can turn a great sound into a whole performance! Let's take a quick look at how it works.

1. Press the [ARP ON] button to activate the Arpeggiator, then press [ARP LATCH] to latch it.
2. Hold [SHIFT] and press [ARP ON] to enter Arp Edit mode page 1.
3. Press two or more pads, then adjust the parameters with the Control knobs.
4. Use Control knob 8 to adjust the tempo.
5. There are more parameters on page 2. Use the Page Up/Down buttons on the right side to change pages.

You can stop the Arp at any time by pressing the [ARP ON] button, and/or press [ARP LATCH] to unlatch the Arp.

When you're done, press [HOME] or [EXIT] to return to the Home page.

We'll describe all of the arpeggiator features in *The Arpeggiator Section (p. 99)*.

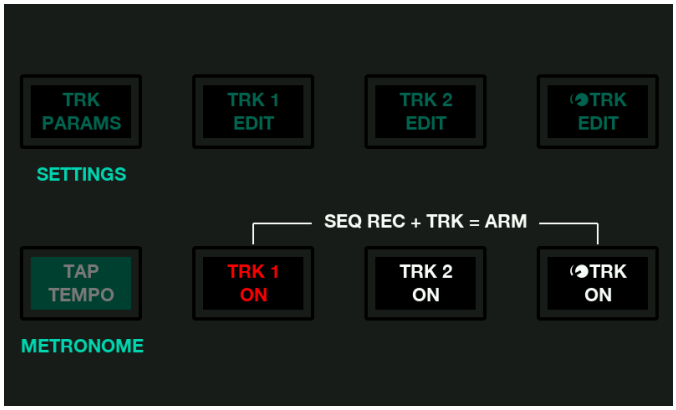
Control	Function	Secondary function ([SHIFT] + button)
Arp On	Toggles the arpeggiator on and off	Enter Arp Edit mode.
Arp Latch	This frees your hands to tweak parameters. Works with or without the Arp running.	Sustain

SEQUENCER BASICS

A sequencer should do more than record a performance; it should give you the tools to create something completely new. The Leviasynth Sequencer offers a ton of creative options to capture and manipulate your music in a myriad of ways. It is an inexhaustible supply of inspiration.

There are two tracks dedicated to what you play on the pads, and a third track to record everything you do with the Macro knobs. We'll go through a simple example in the next section and save the details for the full chapter: *Sequencer (p. 105)*.

To get started, hold [SHIFT] and press [SEQ PLAY] to enter SEQ EDIT mode. Here's what you'll see:



The onscreen buttons provide access to all SEQ functions.

Button	Function	Secondary function ([SHIFT] + button)
Tap Tempo	Tap several times to set the tempo for the Arpeggiator and the Sequencer.	Toggle metronome on/off
Seq Record	Hold this + press a track button to arm that track for recording.	Enter Step Record mode for the armed track.
Seq Play	Starts all tracks from the beginning. Press again to stop playback.	—
Track 1-2 On	Enables / disables that track. Seq Record + Track X On arms that track for recording.	—
Macro Track On	Enables / disables the Macro track. Seq Record + Macro Track On arms it for recording.	—
Track Params	Selects the menu where track parameters can be viewed or changed.	Access SEQ Settings menu.
Track 1-2 Edit	Selects that track for editing.	—
Macro Track Edit	Selects the Macro track for editing.	—

LET'S RECORD!

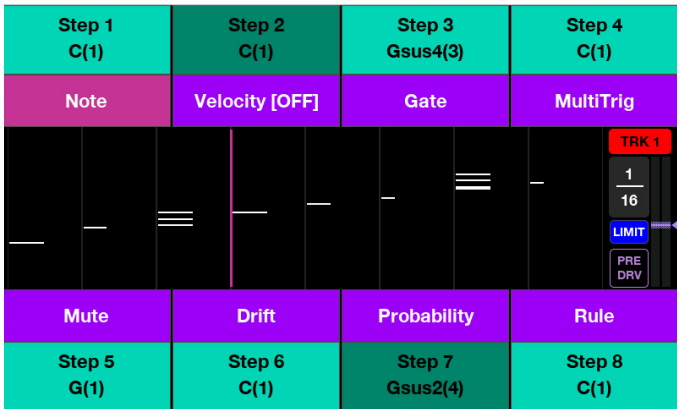
We know you're dying to try it, so let's make a quick recording with the Sequencer. We'll also take a brief look at the Track Edit pages. But the deep dive into all of the features will happen in the *Sequencer (p. 105)*.

1. Press [INIT] twice to initialize the patch.
2. Hold [INIT], press [SEQ REC] (it has the red dot), and press [INIT] again to erase all tracks.

   We did that because initializing the patch does not erase track data or reset the track parameters.
3. Hold [SHIFT] and press [SEQ PLAY] to enter the SEQ EDIT window.
4. Press [TRK PARAMS] and set Track 1's Rate to1/8 and Length to 32.
5. Tap soft button 2 to lock the Length value.
6. Press [EXIT].
7. Hold [SHIFT] and press [TAP TEMPO] to enable the metronome.
8. Hold [SEQ REC], press [SEQ PLAY], and let the metronome count for 4 beats (1 bar).
9. Play a few notes or chords, one per click, and record a 4-bar pattern.

   Don't worry if it isn't perfect on the first try!
10. Press [PLAY] again to stop recording, then press [TRK 1 EDIT].

Let's talk about what you see in the display. Here's an example:



- The lines in the center of the display represent the notes you played.
- 8 steps are visible on one page. Each step holds a note, a chord, or silence.
- The soft buttons show the name of the note or chord contained by each step.
- In this case, steps 2 and 7 are muted, so they are darker. More about that later.
- Use the Down arrow to view the next 8 steps and the Up arrow to return to the previous page.
- You can press [EXIT] or [HOME] to return to the Home page.

That was easy! But don't be fooled; there are many more features to explore, such as Multi Trig, Drift, and Probability. If you're hungry for more, there's a feast in the *Sequencer (p. 105)*.

Before reading on, here's some important information about the Sequencer.

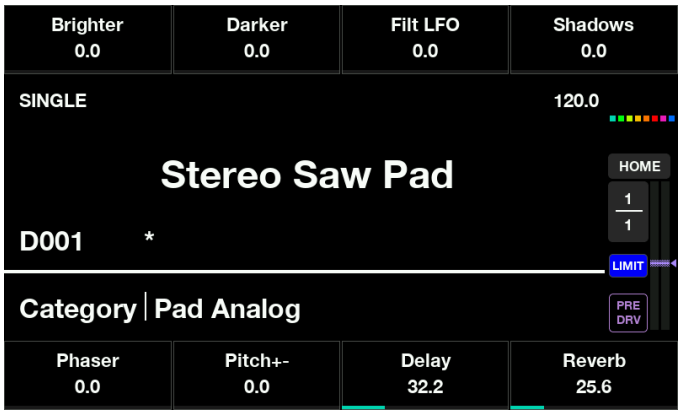
- Sequences are saved with each patch. If you recorded something you want to keep, save the patch before selecting another. See *Save the Patch (p. 142)* to learn how.
- You can export a Sequencer track for use as an Arpeggiator Phrase. To learn more, see *Arp parameters: page 3 (p. 103)*.
- You can record the output of the Arpeggiator into a Sequencer track. This is explained in *Record Arp Notes to a Track (p. 120)*.

Tweaking the sounds

The display provides information about what is happening and what the options are, no matter what you're doing with Leviasynth. We'll dig down into every parameter eventually, but for now let's start at the top again. If you're still in Single mode, press [HOME] to exit to the Home page. If you ventured into Multi mode, please press the [SINGLE] button to make sure you see what we describe.

THE HOME PAGE: MEET THE MACROS

As you have noticed, there are 8 Control knobs around the display. When Leviasynth is on the Home page there are also 8 soft buttons in the display, one for each Control knob. These are modulation sources known as the Macros.



Be sure to try these when you select a patch! They can demonstrate the capabilities of this instrument very quickly. This is because each Macro can alter as many as 8 parameters at one time. Every patch in Single mode has eight Macros available, so a Multi can provide as many as 16 Macros.

Macros can achieve complex results, but they're easy to create. When you're ready to try that, see *Mastering the Macros (p. 121)*.

The rest of the Master Control section has buttons that will be useful in the near future. They will be covered in the *Master Control Section (p. 23)*.

OSC ENV LEVEL & BIAS CONTROLS

These touch-sensitive knobs provide a fast and easy way to make significant, smart changes to a patch. You can make quick, relative adjustments to the envelope rates of the oscillators, or easily change the relative envelope levels of each to alter the timbral complexity of the patch.

"Touch-sensitive knobs" means that you can touch one and see the current value of that parameter without changing it.

THE ANALOG & DIGITAL FILTER SECTIONS

These sections look similar, but they are very different. This table should help contrast the two.

	Digital Filter	Analog Filter
Technology	Digital	Analog
Characteristics	2-pole (12 dB/octave) morphing multimode	4-pole (24 dB/octave)
Type(s)	18 filter models, including state-variable, High / Low / Band Pass, and Vowel	One: Lowpass
Self-resonant?	Some [1]	Yes
Knob 1	Cutoff	Cutoff
Knob 2	Resonance	Resonance
Knob 3	Drive / Morph (depending on the selected filter type)	Pre-Drive
Knob 4	Envelope 1 amount (positive or negative polarity)	Envelope 2 amount (positive or negative polarity)

[1] The LP-NO-HP, BP Stn12, LP Gate, LP 1pole, LP 8pole, and Vowel filters are not self-resonant. All the others are.

That just barely scratches the surface! To delve more deeply into what the Leviasynth filters can do, read *The Filters and their Controls (p. 64)*.

Save the Patch

In the process of tweaking a sound or recording a sequence, you will often create something you'd like to keep. If that has already happened, jump ahead to the Patch Management chapter and follow the instructions in *Save the Patch (p. 142)*.

CHECK FOR UPDATES

Be sure to visit *www.AshunSoundMachines.com* soon, and often! It's your source for important things such as:

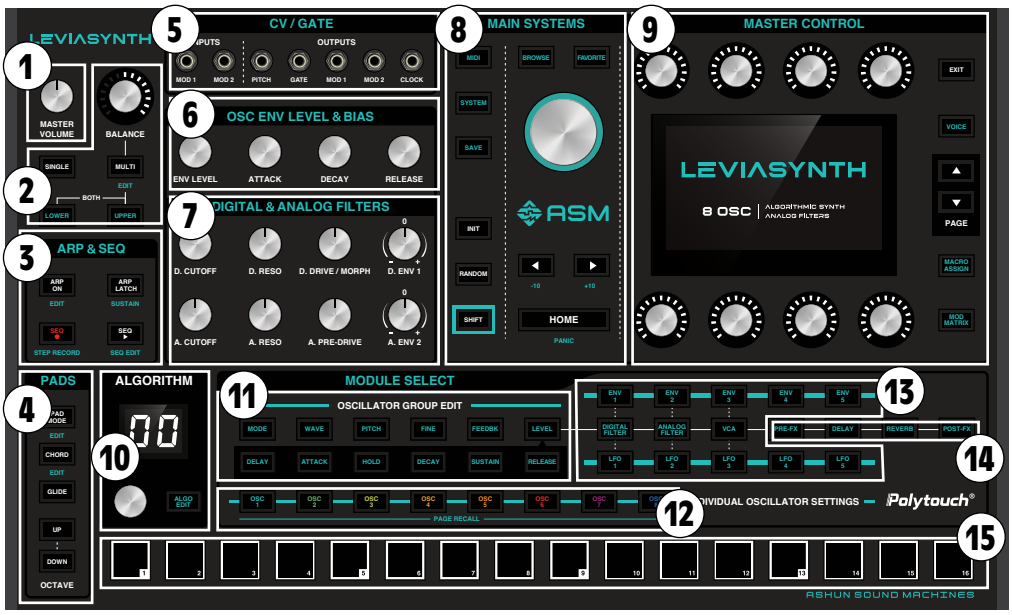
- Firmware updates
- An interactive version of this manual
- Banks of new patches from our top-notch sound design team, plus the original factory banks
- Tutorial videos to help you master the intricacies of Leviasynth
- Our free librarian, ASM Manager
- ...and more!

THAT'S ENOUGH READING FOR NOW.

We've covered the basics. It's time for you and Leviasynth to take a deep dive together!

Leviasynth is everything an ASM product should be: a perfect balance of instant access, intuitive workflow, powerful features, and great sound, all with one goal: to make the creation and performance of mind-blowing music easier and more fun.

TOP PANEL: LEVIASYNTH DESKTOP



1	Master Volume	8	Main Systems section
2	Single mode button	9	Master Control section
	Multi mode controls	10	Algorithm Select / Edit section
3	Arpeggiator & Sequencer section	11	Module Select: Oscillator Group Edit
4	Pad buttons: Mode, Chord, Glide, Octave Up/Down	12	Module Select: Individual Oscillators
5	CV / Gate connectors	13	Module Select: Shapers & modulators
6	Osc Env Level & Bias section	14	Module Select: Effects
7	Filter Controls section	15	Pads

GENERAL CONCEPTS

Access buttons

The Access buttons are located in several areas of the top panel, mostly outside of the Arpeggiator & Sequencer section. Their letters can be different colors, depending on the top panel status. All of the buttons in the Module Select section and many of those in the Main Systems and Master Control sections are Access buttons. Their purpose:

- Press an Access button and the main parameter page for that feature appears in the display for editing.
- If more pages exist, one or both Page buttons will point to the other pages.
- Pressing an Access button repeatedly will also scroll through its pages.

Function buttons

These white-lettered buttons make instant changes (load a patch, toggle something, switch modes, etc.). It might help to remember that

- buttons with *colored* letters **select** things and
- buttons with *white* letters **do** things.

For example: To enable the Arpeggiator, press the [ARP ON] button. To exit any page, press [EXIT] or [HOME].

Some buttons are multi-purpose, so they don't entirely conform to the definitions of Access buttons and Function buttons. Examples are:

- The Pad Mode button (see *Using the Pads (p. 30)*)
- The Chord button (see *Chord mode (p. 28)*)

Mode Select Controls

The Single/Multi buttons select those modes. In Single mode the Multi controls are inactive. In Multi mode the Upper/Lower buttons and the Balance knob are active. The modes are explained in *Multi Mode (p. 129)*.

Part Select buttons

The Part Select buttons are used in Multi mode to specify whether the Upper or Lower part is active on the top panel. Their letters default to yellow and blue, respectively, and the color of the top panel changes when they are pressed. We'll learn more about these buttons in *Multi Mode (p. 129)*.

Control knobs

Above and below the display are two sets of four knobs. They are endless encoders: Parameters are edited from their current value, rather than jumping to another value that was based on the position of the knob.

The Control knobs play different roles depending on the page that has been accessed:

- On the Home page they become Macro controls. Each is paired with an on-screen soft button.
- On a parameter page they are used to adjust parameter values.
- In Multi mode the Control knobs can edit parameters for the Upper part, the Lower part, or Both, depending on the top panel status. The top panel color scheme indicates which parameters are active.

Module Select buttons

These buttons access the parameter pages of the selected module (e.g., Osc 1 settings, LFO 5, Delay, etc.). If a module has more than one page, multiple presses of the same button will reach the other pages.

A white line that begins at the Operator Group Level module and continues to the Post-FX module shows the basic signal path. The Patch Level parameter in the VCA module has the final say, though; it controls the overall level to the outputs.

Vertical lines between module buttons indicate a pre-wired connection: Env 1 / LFO 1 to Digital Filter, Env 2 / LFO 2 to Analog Filter, and Env 3 / LFO 3 to VCA. This means you don't have to set up modulation routes to establish those connections.

You can also use the Module Select buttons as a quick way to set up a Mod Matrix route: Hold one (source) and press another (destination). For information about that, see *The Mod Matrix (p. 125)*.

Knob types

Three types of variable knobs are used:

- 270° encoders: The range has an upper and lower limit. Examples: Master Volume, Analog Filter Cutoff
- Endless encoders: These have no physical range limits, so an edit always starts from the current value. Examples: Control knobs, Algorithm Select
- Touch-sensitive endless encoders: These are a special case, found only in the Osc Env Level & Bias section. They are endless encoders, as described above, but they are also touch-sensitive. This means you can touch one of those encoders and see the current value for that parameter. As long as you don't turn the encoder, the value remains what it was.

MAIN SYSTEMS

Patch selection

One of the major functions of this section is patch selection. There are several methods, and you might use them all at different times depending on what you're doing.

PATCH KNOB

From the Home page you can select an adjacent patch by turning the Patch knob a single click in either direction. You can also jump between the banks if you hold [SHIFT] while turning the knob.

LEFT/RIGHT ARROWS

Press one of these buttons to select an adjacent patch. Hold [SHIFT] first to make the buttons jump through the patches 10 at a time.

Note: When powered up, Leviasynth remembers the last patch you selected and recalls that patch automatically.

The HOME button

The Home button is located at the bottom of the Main Systems section. It provides a quick way to get back to the top level of Single or Multi mode, where the Macro controls are. This is known as the Home page in either mode.

ALL NOTES OFF

Sometimes MIDI signals are disrupted and a note becomes stuck. If that happens, hold [SHIFT] and press [HOME] to transmit an "All Notes Off" command. This will silence any stuck notes.

RESET MIDI VOLUME

Another thing MIDI can do is send MIDI CC #7 (Volume) commands to your Leviasynth, to which it responds as if you were turning the Master Volume knob. This is a great feature, but sometimes the last value sent by the external device or DAW could be very low, or even zero. So if your Leviasynth is silent and shouldn't be, use [SHIFT] + [HOME] to override the last incoming MIDI CC #7 message.

If that doesn't restore the volume, press [HOME] and check the display. If you see the words "LOCAL OFF!" next to the Info section, you can toggle that value by navigating to *Master Settings: page 1 (p. 154)* and tapping soft button 6.

Browse

This page lets you sort and filter the patches you see in the display. You can sort by name or number, and then filter by Bank, Category, and Sound Designer.

The Browse page also contains a robust Compare feature, as well as a soft button (Set Fav) that lets you designate a Multi or Single patch as a Favorite. You can stash an unlimited number of patches in the Favorites section for instant access.

For details, see *Using the Browser (p. 140)* and *Working with Favorites (p. 146)*.

Favorite

When you need to find your best sounds immediately you can jump straight to your favorites from any other page.

- Press the [FAVORITE] button
- Scroll through the list of patches in the display until you see the one you want
- Press the patch name in the display to select it.
- You can also use the patch wheel or the Left/Right arrows to select the next Favorite without touching the display.

It's easy to reorder the favorites list, too. For example, if you want to change a set list for a show, you can keep the patches for that show grouped together but change the order in which they appear. We'll show you how in *Working with Favorites (p. 146)*.

MIDI

This button takes you to the MIDI settings Leviasynth will use to communicate with external devices over USB and MIDI. Among other things, this is where you set the MIDI channel assignments, Clock Sync settings, and send patches in the System Exclusive format. The details are found in *MIDI Settings (p. 150)* .

System

This is where you'll find the global settings for the keyboard, the knobs, the pedals, and the CV / Gate section, etc. It has 8 selectable sub-menus located in the center of the display. Each one has up to 8 parameters that let you configure Leviasynth the way you want. You can even define your own INIT patch as a starting point for making new patches!

For details about each page, see *The System Pages (p. 154)*

The SAVE button

When you make an edit you want to keep, press [SAVE] to access the Save page. You'll be able to select a new location for the edited patch, rename it, and assign it to a category (Bass, Pad, etc.). You can even decide which color the Patch knob and wheels will be when the patch is selected.

There are a couple of other features that increase the flexibility of the Save page:

- Use the Macro parameter (Control knob 7) to determine whether the positions of the Macro knobs will be stored as-is, returned to zero, or saved as edits to the parameters they control.
- Bias (Control knob 8) has similar options for the Oscillator Envelope Level & Bias adjustments you have made. You can convert them to new parameter values if you like, or ignore them and keep the original saved values.

For details, see *Save the Patch (p. 142)*.

The INIT button

RESET A PARAMETER

The INIT button will reset any parameter to its default value: Just hold [INIT] and press the soft button that shows the parameter name and value.

INITIALIZE A MODULE

You can reset the parameters for an entire Module using a similar method:

- Hold [INIT].

- Press the Access button for the desired module.
- Confirm the decision by pressing [YES] in the display, or by pressing [INIT] again.
- If you decide not to initialize, press [NO] in the display or [EXIT] to cancel the procedure.

INITIALIZE A PATCH

INIT Single patch

If you want to build a patch starting with the default settings (ours or yours), press [INIT] and select [YES] in the display, or simply press [INIT] twice. This will erase the contents of the Edit buffer, so be sure to save any edits you don't want to lose. If you change your mind after the first time you press [INIT], select [NO] in the display or press [EXIT] to cancel.

There's more information below about making a *Custom INIT patch (p. 22)*.

INIT Multi patch

There are several levels of initialization possible with a Multi patch. You can:

- Initialize the Upper and Lower patches but leave the other Multi parameters intact (split point, relative levels, etc.)
- Initialize the Multi parameters (split point, etc.) without affecting the Upper and Lower patches inside the Multi
- Initialize the Upper or Lower patch individually.

It's simpler than it may seem, and it will become second nature eventually. For full details, see *Initialize Multi / Upper / Lower (p. 138)*.

Note: Pressing [INIT] twice will also reset the last MIDI Volume command received by Leviasynth. For details, see *Reset MIDI Volume (p. 21)*.

CUSTOM INIT PATCH

If there are certain settings you prefer to use as a starting point when making a new patch, you can save yourself a few steps by defining a new INIT patch. For example, if you always like to have the Analog filter start with the cutoff at X, the resonance at Y, and the Drive at Z, make that your new INIT patch. This is located in *System Services (p. 159)*.

The RANDOM button

If you're the adventurous type, you will love this button! It can randomize the value of any parameter, any module, a single patch, or even an entire Multi.

RANDOMIZE A PARAMETER

To randomize a single parameter, hold [RANDOM] and press the soft button related to that parameter. There are isolated exceptions, such as the Oscillator SOLO / MUTE buttons and some VCA parameters.

RANDOMIZE A MODULE

You can randomize the parameters for an entire Module using a similar method:

- Hold [RANDOM].
- Press the Access button for the desired module.
- Confirm the decision by pressing [YES] or [RANDOM] a second time.
- If you decide not to randomize, select [NO] in the display or press [EXIT] to cancel the procedure.

Randomization of the VCA module does not randomize the VCA Level, Initial Level, or Patch Level.

RANDOM PATCH GENERATION

You can even randomize an entire patch in Single or Multi mode, including the Effects! Sometimes the results are strange, but that's okay; just try it again. Once you get something interesting, you can save it like that or tweak it as needed.

In Single mode there are two ways to randomize the patch. Make sure you save any edits you want to keep before you proceed.

First, press [RANDOM] once. The display shows two options:

- **Generate from scratch** will select a random value for every parameter.
- **Randomize from patches** will grab a random selection of values from other patches and pull them into the edit buffer.

In Multi mode you can randomize an entire Multi, randomize only the Upper or Lower part inside the Multi, or randomize anything inside one of the parts as you would do in Single mode.

There are several ways to do this. But to summarize, you can

- Select [Upper] or [Lower], then press [RANDOM] and choose Generate or Randomize (see above), or
- Hold [RANDOM] and then press [Upper] or [Lower]. This is the Randomize option (grab random values from other patches).

But we left [Multi] out of the examples above, because those are different operations which provide very different results.

- If you select [Multi] and press [RANDOM] twice:

  the parts inside the Multi are randomized,

but the Multi settings are not. Mode, balance, octave ranges, Arp setting, and controller settings are untouched.

- If you hold [RANDOM], press [Multi], and press [RANDOM] again:

  the settings of the Multi are randomized but the parts inside the Multi are not. So the Upper/Lower sounds remain the same, but the MultiMode, split points, balance, octave ranges, Arp setting, and controller settings will be randomized.

PERCENT OF RANDOMIZATION

The Random feature can specify how much randomization happens in each module. Press [RANDOM] and use these two Pages to set the randomization limits for each.

Page	Modules	Range
1	OSC Modes, OSC Waves, OSC Pitches, OSC Feedback, OSC Levels, OSC Envelopes, Analog Filter, Digital Filter	0-100%
2	Envelopes, LFOs, Voice, ModMatrix, Algorithm, Macros, Effects	0-100%

Note: The VCA module is excluded from the Patch Randomization process.

These settings are saved after you make them, so you won't have to set them more than once if you don't want to.

Note: The Range setting also affects the results when you randomize a specific parameter within a module (e.g., the OSC 1 Waveform). Any feature with a randomization percentage set to 0%, for example, will not be randomized.

RANDOM PATCH SELECTION

Leviasynth can select a patch for you:

- Hold [RANDOM] and press one of the Left/Right arrows.
- Confirm the procedure by pressing [RANDOM] again, or press [EXIT] to cancel the process.

The SHIFT button

The Shift button is used in combination with other buttons to access secondary functions. When these are available the secondary functions are indicated with a row of cyan text under the control.

In some cases [SHIFT] is used to accelerate value selection. For example, if you hold [SHIFT] and turn the Patch knob you can jump between Patch banks, as opposed to the standard operation of +/- 1 patch.

You can also use [SHIFT] to help fine-tune a value that has a large range. For example, if you want to set a precise value for filter resonance, hold [SHIFT] and turn the appropriate Control knob.

For a complete list of the available Shift functions, see *Control Combinations (p. 160)*.

MASTER CONTROL SECTION

If you like to make your own patches, you might enjoy this section the most. When a Module is accessed the parameters and their values are visible in the display, and can be adjusted with the Control knobs. The soft buttons on each page can be used to set up mod routes, reset or randomize values, and perform other tasks that we'll describe as we go.

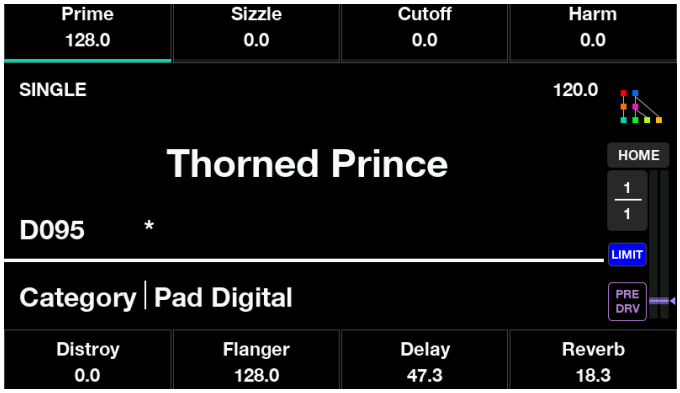
In Multi mode these same controls edit the Upper part, the Lower part, or Both, depending on the top panel status. The Access button colors tell you which parts are active.

The Page Up/Down buttons provide access to more parameters whenever a Module offers more than eight. We'll describe the parameters of each Module in *Modules: The Basics (p. 32)*.

The Master Control section is also a lot of fun when you're on the Home page, thanks to the powerful Macro controls. For live performance or on-the-spot creativity, the Macros can kick everything into high gear. See *Mastering the Macros (p. 121)*.

The display

At the center of it all is a high-resolution, interactive LED display. It is the main window into the inner workings of Leviasynth.



SOFT BUTTONS

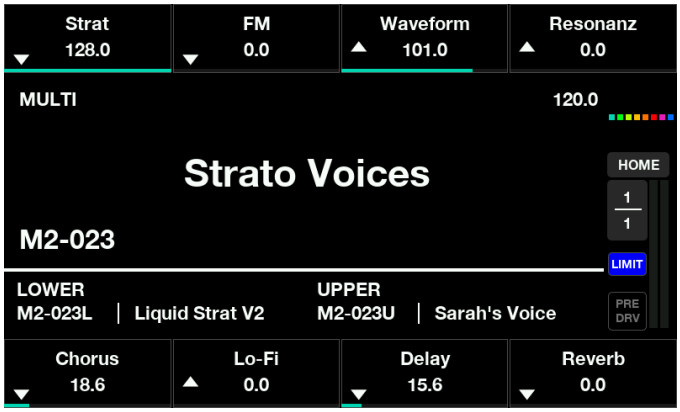
Each Control knob is paired with an area of the display known as a soft button. Their function depends on the page that has been accessed.

- On the Home page they become Macro buttons, and can affect a Macro in one of four ways (Toggle, Trigger, Switch, or Reset). This choice is made in System settings in the *Control Settings (p. 156)*.
- On a parameter page they are used to:
  - show the value of the parameter being edited
  - toggle a value (Oscillator Solo on/off, for example), or
  - enter a lower-level editing page (i.e., the Step Edit menu of a Step LFO).

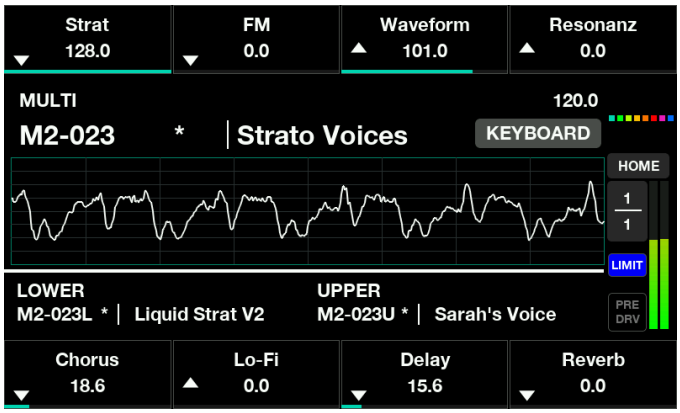
Now, press [HOME] and we'll continue our description from there.

IN THE MIDDLE: NAMES & NUMBERS

The middle of the display contains information about the current patch: its name, its location (Bank and Number), its category (in Single mode), and its component patches (in Multi mode, pictured below).



This is how the display looks when a patch is first selected. It stays like that until you play a note, at which point the display is replaced temporarily with one of two graphical views: a keyboard or the Waveform view.



To toggle from one to the other, tap the word "KEYBOARD" or "WAVEFORM", depending on which one is shown. After 2 seconds of inactivity the screen returns to the Home page.

ABOVE & BELOW: MACRO SETTINGS

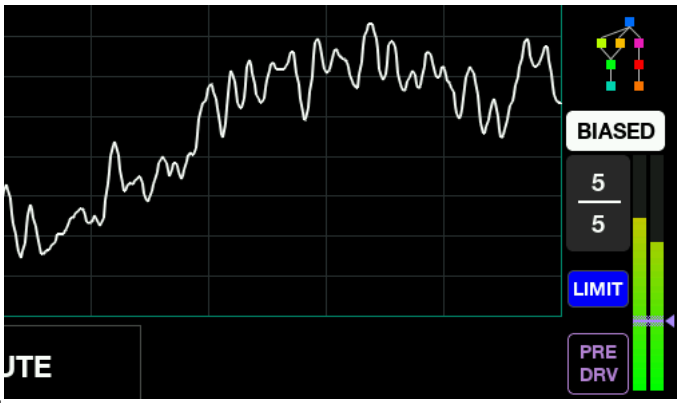
The top and bottom sections of the display tell you what the Macro controls will do when activated. What you'll see depends on the mode you're in:

- In Single mode it shows the name of each Macro, its current value, and the Soft button status. A default name (Macro X) with a dash beneath means no assignments have been made.
- In Multi mode you'll see the information described above and more, such as whether a Macro is assigned to control the Upper patch, the Lower patch, or Both, in addition to the current value and Soft button status. For details about the Macros that are specific to Multi mode, see *Display contents (p. 130)*.

If you want to learn how to set up a Macro to control specific parameters, see *Mastering the Macros (p. 121)*.

RIGHT SIDE: THE INFO SECTION

On the right side of the middle of the display is the Info Section. It shows important, useful information that is easy to understand. It also provides an instant toggle for the *Master Limiter (p. 155)*. On some pages the Info section is taller than on other pages, but the same information is there in each case.



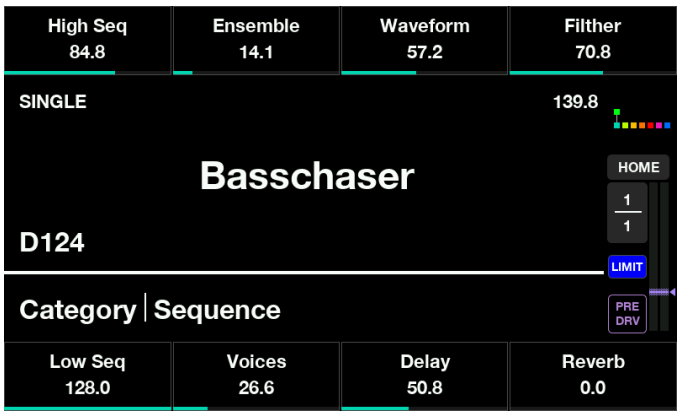
The Info section is on almost every page, with some exceptions; it isn't there inside [SYSTEM,] [SAVE], [BROWSE], [FAVORITE], and [MOD MATRIX].

Here's what's tucked into this small-but-mighty section:

- **Algorithm thumbnail**: Those colored dots represent the oscillators and how they're connected in the current algorithm.
- **Module name**: If Envelope 3 is selected, for example, you'll see ENV 3 here. If Track 1 is selected, you'll see TRK 1, etc. The icons are color-coded to match the oscillators when one is selected. Other icons you might see here: BIASED (when the Bias controls have altered a value), a Chord name (in Track 1 EDIT), and the Track Record status (TRK 2 in a red background), among others.
- **Page x/y**: This tells you which page you're on and how many pages there are in the current module. For example, press [OSC 4] and you'll see 1/5. This means you're on page 1, and Osc 4 has 5 pages.
- **VU meters**: These are along the rightmost edge. If the signal clips and the limiter is off, you'll see red bars at the top and the CLIP LED turns red. If the Limiter is on and the signal is hot enough, you'll see blue bars at the top and the LIMIT LED turns blue.
- **Limit / Clip button**: Tap the CLIP / LIMIT icon to toggle the Master Limiter on / off. It's connected to that setting in *The System Pages (p. 154)*. When it changes here, it changes there, and vice-versa.
- **Pre-Drive**: In addition to the icon, a purple graphic with a variable position indicates when Pre-Drive is set to a non-zero value. When the value is zero, the purple line disappears and the [PRE DRV] icon turns gray.

VALUE BARS EVERYWHERE!

As mentioned earlier, inside every module the parameter values are visible in the display. But there's more! You might not see it at first, but the values are often underlined by small colored bars (i.e., value bars). Sometimes the value bars are color-coded, as on the Oscillator pages; on the other pages they are cyan.



When a parameter is halfway through its range, the value bar is also halfway from the left side to the right side of the space under the soft button. It changes along with the value as edits are made. They also indicate the number of potential values: When a parameter has seven values like an LFO Waveform, for example, the value bar travels further with each value change than it does when a parameter has a lot values, like the LFO Rate.

Now that you've noticed them, you'll see the value bars on the Home page too, as an additional visual reference for the current value of each Macro.

EXIT button

This button lights as soon as you enter any page. It will take you back to the previous page, and it can cancel a process if you decide not to do something (Initialize, Randomize, Save, etc.). The Home page is the only page where [EXIT] is not lit, because that's the top level of the patch.

VOICE button

This Access button takes you to a set of features that affect an entire Single mode patch, or the parts in a Multi: Pitch bend range, Vibrato settings, Mono/Poly/Unison voice modes, the Glide settings, and more. This is also where the Scale is defined for each patch or part in a Multi.

The Voice module is also home to the Analog Feel, Random Phase, the Panner options, and the VoiceMod settings. These can really bring a patch to life.

For more information see *The Voice Module (p. 89)*.

PAGE Up/Down buttons

These two buttons are lit if the selected module has more than one page. If one of those buttons is lit that means there are pages available in that direction. If both are lit then pages are available in both directions. If neither is lit, there are no additional pages to select.

Access buttons can be used to flip between pages too, which works great if there are only a few pages. But if the module has a lot of pages and the parameter you want is more than a few pages away, hold [SHIFT] and press one of the lit arrows to jump to the first or last page. Then use the Page Up/Down

buttons to reach the desired page.

MACRO ASSIGN button

This Access button opens a page that is like a hallway with eight doors, and behind each one is a lab that makes a powerful performance control called a Macro. You can define up to eight modulation targets for each Macro, and then use the Control knobs and soft buttons to manipulate the Macros from the Home page. Each patch has its own set of 8 Macros, so a Multi controls as many as 16 (2 per Control knob).

To learn more about what's on the other side of those doors, see the chapter *Mastering the Macros (p. 121)*.

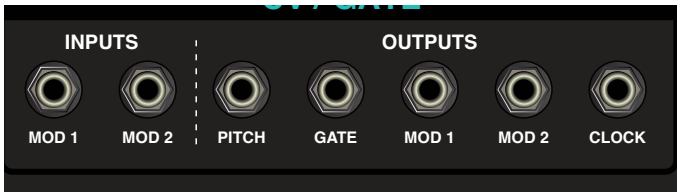
MOD MATRIX button

The Mod Matrix button reveals a digital patch bay that provides up to 32 sets of modulation routes per patch or part. These are in addition to the Macros, although they can control them (and vice versa).

- Potential modulation sources include LFOs, Envelopes, Aftertouch (both kinds), MPE (three kinds), plus the Expression pedal, CV inputs, and any MIDI CC # (Continuous Control number).
- Destinations can be almost any Leviasynth parameter, including another modulation route. Additional destinations include the Arpeggiator, Sequencer tracks, Macros, the Mod 1 and Mod 2 CV outputs, and any MIDI CC #.

There's a lot to say about this topic, so you'll want to read *The Mod Matrix (p. 125)*.

CV/GATE SECTION



These seven connectors allow Leviasynth to interface with the wild and wonderful world of modular synthesizers. There are five outputs (Pitch, Gate, Mod 1, Mod 2, and Clock) and two inputs (Mod 1 and Mod 2).

The outputs send voltages and signals that can control external devices, and the inputs receive voltages that allow external devices to control parameters inside Leviasynth.

The range of each voltage and what type of signals are sent are defined in *The System Pages (p. 154)*, and information about how to use them is in *The CV / Gate Section (p. 148)*.

ARPEGGIATOR/SEQUENCER SECTION

Leviasynth provides an exciting set of music-making features you can enjoy immediately. Each patch has its own arpeggiator and a set of sequencer tracks, which can work separately or together in many ways.

If you'd like more information now, there's a dedicated chapter for each. See *The Arpeggiator Section (p. 99)* and *Sequencer (p. 105)*. There are also some simple examples in *Arpeggiator & Sequencer (p. 15)*.

FILTER CONTROLS

Sweeping the filter frequency of a sound is a great way to heighten the emotional impact of the music. This is especially true during an arpeggio or a sequenced passage.

Leviasynth offers two sets of controls for exactly this purpose. You can sweep the frequency of either filter, adjust its resonance, control the pre-drive amount of the Analog Filter, and adjust the drive amount of Filter 1 or morph it between three states, depending on the selected Type.

For details, refer to *The Filters and their Controls (p. 64)*.

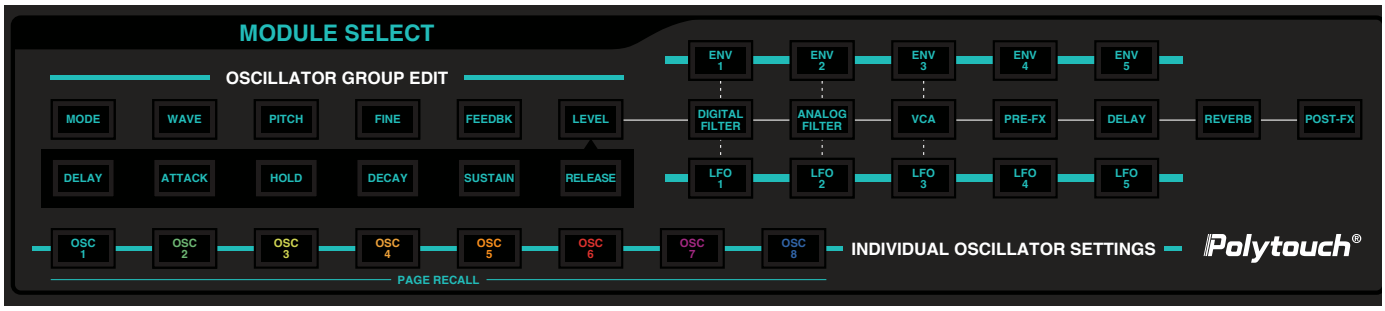
ALGORITHM SELECT/EDIT

An algorithm defines the relationships between the Leviasynth oscillators. Use the knob to select one of the pre-defined factory algorithms, or make one of your own on the Custom Algorithm page. Your new algorithm is stored with the patch in which you created it.

Many module pages show a thumbnail view of the preset algorithms. This helps keep track of the relationships between the oscillators while editing. Press [ALGO EDIT] for a larger visual representation of the algorithms and to access the Algorithm Edit page, where you can create your own algorithm.

There are many thousands of possible configurations, in addition to the hundreds we provided. You can even morph between algorithms! For more details, see *Algorithms – The Framework (p. 59)*.

MODULE SELECT



The Module Select section has 37 Access buttons which are used to view and edit the parameters for each patch or part in a Multi. Their placement provides a visual reference for the signal flow, which starts with the oscillators, moves through the filters, proceeds through the effects, and is sent to the outputs.

Pressing a Module button reveals the first page of parameters for that module. If more than one page exists, the Page buttons are used to access the other pages, as described earlier in *PAGE Up/Down buttons (p. 25)*. Full details about the parameters of each Module are found in the chapters ahead.

There are three main types of modules.

Oscillator Group Edit modules

Select one of these when you want to edit or view the values for the same parameter in all eight oscillators side-by-side.

Individual Oscillator modules

Press one of these when you want to focus on a specific oscillator and edit or view several of its parameters at the same time.

Sound-shaping modules

These buttons access the parameter pages for the selected module: Analog Filter, Env 3, LFO 4, Pre-FX, Reverb, etc.

PERFORMANCE CONTROLS

Leviasynth was designed to encourage the spontaneous exploration of sound and rhythm. Whether live or in the studio, the potential for unique performances is enhanced by the Macro controls on the Home page, as well as controls for the Filters, the Arpeggiator & Sequencer, and other parameters. Along with those are a host of other interactive features, such as 16 Polytouch® pads, Octave buttons, Chord mode with Random Velocity and Flam, and a Glide button. And thanks to a healthy number of CV inputs and outputs, the outside world can join the party!

We offer two models with identical voice architecture and complementary features. And if you have two Leviasynth units you can combine their polyphony by enabling *Overflow (p. 152)*. It's a very cost-effective way to multiply the creative potential of your system.

Octave buttons

The Octave Down/Up buttons shift the range of the pads to reach lower or higher notes, and flash faster as the shift increases. This feature is handled differently depending on the current mode:

SINGLE MODE

The pad range shifts by octaves, locally and over MIDI. The setting is stored with the patch.

MULTI MODE

Multi (dual): The pad and MIDI ranges shift for both parts.

Multi (split): The split point shifts, which means more pads to play one part or the other depending on the button used. This also affects which pads send to which MIDI channel.

Octave Shift and Multi mode

Regardless of the Multi mode (Dual or Split),

- The setting is not stored with a Multi patch. When a new Multi is selected, the Octave shift is reset to center.
- You can shift the octave ranges of the Upper/Lower parts independently in Multi Edit mode. See *Multi Edit: Page 1 (p. 132)*.

The crossfade zones also shift when the Octave buttons are used, both locally and over MIDI. For details about crossfade settings, see *Multi Edit mode (p. 132)*.

Chord mode

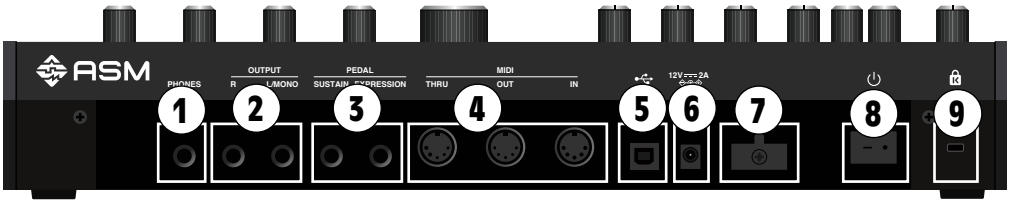
A single pad can play multiple notes at once by activating the [CHORD] button. But a chord must be created before the button can be used.

To create a chord, hold [CHORD] and it will flash. Then play the notes you want the chord to contain. You can press them all at once or one at a time, which allows you to build chords that are outside your normal reach. The lowest note you enter becomes the root note. When you're done, release the button.

A chord can be saved with each patch (2 chords in Multi mode; one per part). The status of the Chord button and the chord(s) you create are remembered when the patch is selected.

There are even more things you can do with a chord, courtesy of the Random Velocity and Flam features. Full details are in the *Chord (p. 33)* section of the Modules chapter.

REAR PANEL



Section	Name	Description
1	Phones output	6.35 mm (1/4 in); 16 – 75 Ohm
2	Outputs	Left (mono), Right (for stereo)
3	Sustain pedal input	Polarity sensing on startup
	Expression pedal input	Polarity can be inverted in the System pages
4	MIDI connectors	In, Out, Thru
5	USB connector	Type B for computer connection
6	DC power connector	12 volts DC, ≥2A
7	Power cable guard	Helps prevent accidental disconnection
8	Power switch	Gets the creative juices flowing!
9	Kensington lock	Helps prevent unwanted relocation

Outputs

Leviasynth has a pair of balanced 1/4" outputs. Connect only the Left output for mono; connect both Left and Right outputs for stereo.

Here are some things to know:

- The Master Volume controls the Upper and Lower parts.
- The Balance control affects the relative levels of the Upper and Lower parts.

Control Inputs

SUSTAIN

Connect a momentary footswitch here. Its polarity is detected on power-up, so any brand of pedal can be used.

EXPRESSION

Connect a variable foot pedal here. Its polarity and range can be adjusted in *The System Pages (p. 154)*, which makes it compatible with a wide range of pedals.

This input can also be used as a modulation source

in the Mod matrix, so it can do far more than control the volume! But it's important to know that the Expression pedal does not control the volume of a Leviasynth patch automatically. It must be set up on a patch-by-patch basis to control VCA Level in the Mod matrix in order to do so. To learn how to use the Mod matrix, see *The Mod Matrix (p. 125)*.

The Expression pedal sends MIDI CC #11 (Expression). This can be disabled on *MIDI Parameters: page 2 (p. 152)*.

MIDI

Leviasynth has three 5-pin MIDI connectors so you can interface with devices that might not have a USB port or CV / Gate connectors.

- **MIDI Out** sends data from Leviasynth to another MIDI device
- **MIDI In** receives data from another MIDI device
- **MIDI Thru** passes the data that arrives at the physical MIDI In jack to another MIDI device. It does not send the MIDI information generated by the Leviasynth pads or controls.

USB

Use this port to connect Leviasynth to your computer.

Power

CABLE LOCK

There's nothing worse than having someone trip over a cable and unplug something. We encourage you to take advantage of this additional level of protection for the power supply cord.

ON/OFF SWITCH

There are only two options here: O = Off and | = On.

Kensington lock

Let's face it: the music you make with Leviasynth will transport your audience! And just in case they get a bit carried away, we've included the Kensington lock system so you can keep your Leviasynth from also being carried away.

USING THE PADS

The 16 Leviasynth pads serve many purposes. Their most obvious application is for playing the patches, but there are lots of other uses. In this chapter we'll focus on everything related to playing notes and scales with the pads. If you want information about using the pads with the sequencer, see the *Sequencer (p. 105)* or *Pad Mode = Step Seq (p. 118)*.

THE PAD MODE BUTTON

Hold [SHIFT] and press [PAD MODE] until the display says "PAD MODE PLAY". In this mode you can:

- Shift the pad range up and down by octaves
- Offset the pads chromatically to reach lower or higher notes
- Select specific scales for the pads to play
- Filter the pad assignments, so only notes within the scale are available
- Select the root note for the pads, so they play the selected scale in any key
- Save independent settings for all of the above with each patch, or
- Lock the global settings for the pads, so everything is the same for all patches.

It's easy to tell whether the pads are in SEQ STEP or PLAY mode: If you see a purple pad, the pads must be in Play Mode.

Note: The setting of the Pad Mode button is not saved with the patch. When you change the Pad Mode it stays that way until you change it again or power-cycle the unit.

PAD EDIT PAGE

Control	Parameter	Settings	Description
4	Lock Global	Off, On	Make Pad Edit settings per-patch or global
5	Play Mode	Chromatic Piano / Chromatic Scale / Scale Only	Pad layout options for Pad Key / Scale
6	Pad Key	C to B in chromatic increments	Selects the key / root note for the pads.
7	Pad Scale	(see below)	Selects the scale for the pads.
8	Pad Offset	-11 to +11	Left / right offset of notes on pads

Lock Global

When this parameter is enabled it locks the settings on this page, so the pads will behave the same way for every patch.

Note: This parameter is not to be confused with the Lock Global parameter of the *SEQ Settings (p. 111)*. This one affects only the pad settings, and does not affect or protect the Sequencer tracks.

Pad color definitions

Keep these pad colors in mind as you alter the Play Mode, Pad Key, and Pad Scale.

- Root note: purple
- Notes in the scale: cyan
- Notes not in the scale: grey

Play Mode

CHROMATIC PIANO

This mode shows black and white keys on piano, and purple indicates the root note (selected Key). It has nothing to do with scale.

Think of this mode as showing the black and white keys on a piano. The Pad Key is the only parameter that makes a difference here. The note produced by each pad is what changes as the Key is changed. The purple root note pads stay where they are, but the colors of the other pads change to indicate whether the note on each pad would be played by a white key or a black key. The Pad Scale setting is irrelevant.

CHROMATIC SCALE

This mode shows the notes of the selected scale in the proper colors: Purple for the root note, cyan for the notes in the scale. The notes outside of the scale are more dim and are outlined in grey. This helps you stay within the scale while giving you the freedom to play notes outside of the scale.

With the Chromatic Scale option:

- All keys and scales have two root notes (purple pads), and they're always on pads 1 and 13.
- The difference between the scales is the number of cyan pads (notes in the scale) and grey pads (notes not in the scale).

SCALE ONLY

This mode shows only the notes within the selected scale. Notes outside of the scale are not available.

With the Scale option:

- Most scales contain < 8 notes, so they have 2 or 3 purple pads (i.e., that many root notes).
- Some scales only have 5 notes (PentaMaj, PentaMin, In, Insen, and Hirajoshi), so they have 4 purple pads (4 root notes).

Pad Key

This selects the key/root note for the pads. If this is the only Pad parameter you change, the purple pads stay put; this only changes the pitch they play.

If you change the other settings, the first pad is the only one that will never change. Other Play Mode or Scale settings might change the number and position of the other purple pads.

Pad Scale

This selects the scale for the pads. It has all but one of the options listed in *Scales (p. 163)*.

So why is the Chromatic scale not available as one of the choices? The reason is that it would be identical to the Chromatic Piano option for the Play Mode.

The Scale selection will change all of the other pad colors, unless the Chromatic Piano option is chosen. Then it has no effect on what note the pads play.

Pad Offset

Positive values of the Pad Offset parameter move the notes on the pads to the right so you can reach higher notes. Negative values move the notes on the pads to the left so you can reach lower notes.

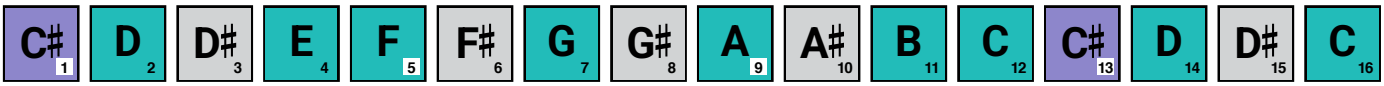
SCALE/KEY/MODE EXAMPLES

A picture is worth a thousand words, as they say!

- Root note: purple
- Notes in the scale: cyan
- Notes not in the scale: grey

Chromatic Piano (C)

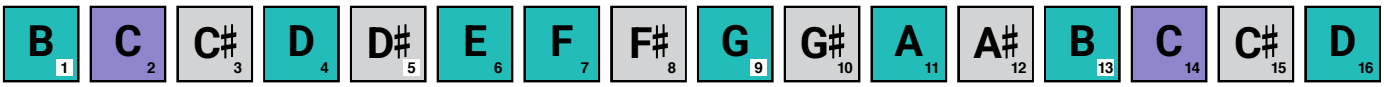
Chromatic Piano (C#)



Chromatic Scale (C major)

Chromatic Piano (C major, offset +1)

Chromatic Piano (C major, offset -1)



Chromatic Scale (C# major)

Scale Only (C major)

Scale Only (C# major)

The colored Access buttons select particular modules for editing, and can also be used to create new mod routes. They are arranged roughly in the order of signal flow, from left to right: [Oscillators] > [Level] > [Filters] > [VCA] > [FX]. There's a line that stretches from the Level module through the Post-FX module that helps illustrate this, with only one exception: The Voice module, which is located below the Exit button. It provides features such as the Unison modes and Scale.

Dotted vertical lines indicate the availability of pre-wired connections between certain modules. More about that later in this chapter.

MODULE GROUPINGS

We'll touch briefly on the modules here; most have their own chapters. The goal here is to show how related modules are grouped, and to introduce a quick way to create modulation routes.

For the sake of simplicity, the descriptions and examples for each module will assume Leviasynth is in Single mode (unless otherwise noted). Details about using the modules in Multi mode are provided in *Edit Multi Parts (p. 135)*.

The Oscillator section

Almost half of the buttons beneath the display belong to the Oscillators. There are two subsections: Individual Oscillator Settings, described in *Oscillators: the Building blocks (p. 36)*, and the *Oscillator Group Edit (p. 52)* buttons.

For now, here's a quick look at what they do:

INDIVIDUAL OSCILLATOR SETTINGS

These access the settings for one oscillator at a time. There are 5 identical pages for each Oscillator, with one exception for Osc 1 (see *Direct Out (p. 42)*). The LED button is brighter for the currently selected oscillator when all voices are silent. Notice that the oscillators are color-coded: Osc 1 is cyan, Osc 2 is green, etc. This is true not only for the Oscillator Settings button LEDs but often in the display as well, such as when viewing the envelope segments in the Oscillator Group Edit section.

OSCILLATOR GROUP EDIT

These let you edit certain parameters for all 8 oscillators on one page. Half of the buttons have multiple pages; the other six have only one page. This is covered in *Oscillator Group Edit (p. 52)*.

THE LEVEL MODULE: ALL TOGETHER NOW

After the Oscillators generate the waveforms they head to the Level module (top right in the Oscillator Group Edit section), where you can set their relative levels. Then the combined signal is sent to the filters to be shaped, with the Envelopes, LFOs, VCA module, and FX adding their contributions to the overall sound.

The Filters: Opposites attract

The two filters are similar in function but their features are very different.

- The first is a Digital filter with 18 types, including a 2-pole (12 dB/octave) morphing multimode filter and a smattering of other filter types, including High Pass, Band Pass, and Low Pass options, plus a powerful vocal formant filter.
- Next in line is a 4-pole (24 dB/octave) Analog filter. Its circuitry and sound are similar to that of the most famous portable synthesizer of all time, except Leviasynth has 16 of these filters (one per voice).

These two filters complement one another perfectly. Full details are in *The Filters and their Controls (p. 64)* .

Envelope group

All five of the top-panel Envelopes have identical parameters, and each can be triggered by up to four sources. Dotted lines connect the first three ENV modules to the Digital Filter, the Analog Filter, and the VCA module respectively, which means they have pre-wired connections that show up as parameters in those modules. But all Envelopes can be used as modulation sources for any destination, and Envelopes 4 and 5 can be used as additional modulation sources for the Filters and the VCA module.

Note that Envelope 3 does not show up by name inside the VCA module, but its input level is controlled by the VCA Level parameter.

The Oscillators have their own envelopes, which are nearly identical to Envelopes 1-5. Those are described in *Oscillators: the Building blocks (p. 36)*.

LFO group

All five LFOs have identical parameters. Dotted lines connect the first three LFO modules to the Digital filter, the Analog filter, and the VCA module respectively, which means they have pre-wired connections that show up as parameters in those modules. But all LFOs can be used as modulation sources for any destination, and LFOs 4 and 5 can be used as additional modulation sources for the Filters and the VCA module.

VCA module

The VCA module contains six parameters:

- **VCA Level** controls the impact Envelope 3 has on the VCA. It can also compensate for quieter or louder output from the oscillators and filters.
- **Initial Level** lets you open the VCA manually. Any non-zero value becomes the baseline from which VCA Level and Envelope 3 begin to affect the VCA. Use this parameter as a modulation destination, for example, when you want to open the VCA with an incoming control voltage at one of the Mod 1 / Mod 2 inputs. This will likely reveal the last 16 notes that were triggered, but the sound will be produced by the current patch.
- **Patch Level** is the final arbiter of the loudness of the patch. Use it to balance the level of each patch to suit your preferences.
- **LFO 3 Amount** adjusts the amount and polarity of LFO 3 as it modulates the Amplitude of the patch.
- **Velocity > ENV** controls the velocity response of Envelope 3, and in turn its impact on the VCA. Negative values invert the response, so an increase in velocity reduces the amplitude. Values above 0 decrease the output to create headroom for any maximum velocity notes to reach the VCA Level setting.
- **PolyAT** determines the amount of variation in the VCA level on a per-voice basis. Negative values decrease the VCA level as pressure increases.

For information about how these parameters interact, see *The VCA Module (p. 70)*.

FX group

Rounding out each patch is a healthy array of effects processors, from pitch effects to spatial emulations and much more. With these a raw sound can become sweet or angry, pure or distorted, straightforward or mangled.

Once the rest of the synth has had its way, the signal flow is [Pre-FX] > [Delay] > [Reverb] > [Post-FX] > Output. For specific details read *The Effects (p. 85)*.

OTHER MODULES

Voice module

Though not located in the Module Select section, the Voice module has a significant impact on each patch. It determines how many notes are available, which ones will play, and how they sound, through parameters such as Polyphony, Unison Detune, Analog Feel, Random Phase, Glide, Bit Depth, and Scale. These are fully described in *The Voice Module (p. 89)*.

Chord

It can be a great effect to push a button and have one note produce multiple pitches, such as adding an octave or a fifth to a lead, a fifth and a ninth to a pad, etc. The Chord button does all of that and more.

We've taken Chord mode beyond what you might expect by adding some features: Random Velocity and Flam. These can add variations to the chord to keep it from seeming static. Those features are described in the next two sections.

Here are some of the main things to know about Chord mode:

- A chord can have between 2-16 notes.
- A chord can be saved with each patch, and is remembered when a patch is selected.
- The Upper and Lower parts can share the same chord in Multi mode, or each can have its own chord. Those details are in *Chord mode and Multis (p. 139)*.
- Chord mode puts the pads into mono mode (last note priority).
- All notes in the chord will be quantized to notes within the selected scale. (See *Select a Scale (p. 95)* in *The Voice Module (p. 89)*.)
- The chord is also sent to USB and MIDI. An incoming MIDI note can trigger the chord as long as the Chord button is lit.

RANDOM VELOCITY

This parameter lets you inject a bit of unpredictability to the chord. As each note is triggered, Leviasynth will mix it up a bit by changing the velocity of the notes in the chord according to the amount you specify.

The Random Velocity parameter won't affect the chord unless at least one velocity range has been programmed into the patch. For example: Starting with an INIT patch, the Random Velocity parameter does nothing because all velocity-related parameters have been reset to zero. But after you create a chord and add VCA Velocity > ENV, you'll hear the difference immediately.

FLAM

Rather than having the notes in the chord always triggered at the same instant, you can add up to 200 ms of delay between the triggering of each note. This can heighten tension, add a strum-like element, etc. At the maximum settings, the last note of a 16-note chord would be triggered over 3 seconds after the first!

LOCK GLOBAL

If you've created the best chord ever and want to apply it to every patch without having to recreate it for each patch, set this parameter to On. This works even for patches that didn't have a chord in the first place.

Lock Global also preserves the status of the Chord button itself, so when the Chord button is lit, the chord will be enabled for every patch you select within that mode. Single and Multi modes operate independently, of course.

MODULE SHORTCUTS

The top panel buttons can do a lot more than access parameters for editing. They can be used to create a mod route within seconds, for example, or to copy parameters between similar modules.

Create Mod routes

There's a shortcut to set up one or more mod routes very quickly. Instead of accessing the Mod Matrix through its button and navigating to the right page and field, try this from the Home page:

- Press and hold the module button for the desired source (an LFO, for example). For a full list, see *Modulation Sources (p. 127)*.
- Press the module button for the destination you want to modulate. See *Modulation Destinations (p. 128)*.

If you've chosen valid components for the route the display will jump directly into the Mod Matrix at the first empty modulation slot, with the first parameter of the destination module highlighted. From there you can select a different parameter within that module using the upper Control knob and set the modulation amount with the lower Control knob. If the destination parameter has a top panel knob available, turning that will select it as the destination.

This technique can also be used inside the Mod Matrix pages. The advantage to doing it there is that when you hold a source button, all of the potential mod route destinations will light up. They don't do that from the Home page.

The Mod Matrix will be covered more fully in *The Mod Matrix (p. 125)*.

Select Macro Destinations

On the Home page the Control knobs and soft buttons can adjust up to 8 parameters each (16 in Multi mode). The module buttons make it easy to set these up.

First Leviasynth must be on the Macro Assign page, where the module buttons become shortcuts to select the parameters you want to control. This is much faster than scrolling through all of the other modules to reach the one you want.

Everything you need to know about setting up Macros is in the chapter *Mastering the Macros (p. 121)*.

Page recall

Some modules are identical, and when programming a patch you might want to inspect and/or alter the same parameter across several modules of the same type. Leviasynth makes this easy! For example, when you're on page 3 of Oscillator 1, hold [SHIFT] and press [OSC 2] or [OSC 5], and you'll be taken to page 3 of the other Oscillator. Without this feature you'd have to press [OSC 2] three times to reach page 3, then do that again for [OSC 5], etc.

The same shortcuts also work for the LFOs and the Envelopes. For example, when you're on page 4 of Envelope 1, hold [SHIFT] and press [ENV 3] or [ENV 4], and you'll be taken to page 4 of the other Envelope.

What's even better is that you can be editing something completely unrelated, like the Digital Filter or one of the FX, and if you want to return to the last page you had selected for LFO 3, for example, hold [SHIFT] and press [LFO 3] and Leviasynth will recall that page for you.

The silkscreen under the Oscillator buttons reminds you about this feature (see *Oscillator shortcut: Page Recall (p. 37)*), but it works the same way for ENV 1-5 and LFO 1-5 even though those buttons don't

have the silkscreened words underneath.

Note: Page Recall does not remember a different page for each Oscillator, etc.; it only remembers one page per module type.

Copy/Paste settings

Some modules are identical, and their parameter values can be copied from one module to another. For example, you can copy the settings from Oscillator 3 to Oscillator 4, or vice versa, because their data is interchangeable.

Some modules have unique features and capabilities and their data is not interchangeable. For example: you can't copy the settings from Filter 2 to Filter 1 because their parameters are very different.

COPY/PASTE PROCEDURE

The process of copying the settings between compatible modules is simple:

- Press and hold the Save button: All modules that are potential copy sources are lit
- Select the copy source: Only potential paste destinations remain lit
- Select the paste destination. The process will execute and all buttons will become unlit, indicating success.

Here's a real-life example: Let's say you want to copy the settings from Envelope 1 to Envelope 2, and then make some adjustments so Envelope 2 comes in more slowly and fades out sooner. It's easy: Hold [SAVE], press [ENV1], and then press [ENV2]. Release the Save button and you're ready to edit Envelope 2.

This can be done in Multi mode too, with one or both parts selected and even between the Upper and Lower parts! You'll find that information in *Copy / Paste in Multi mode (p. 136)*.

MODULES THAT WILL

When the Save button is held some of the Module buttons are lit. These are the ones that can be copied and pasted. There are limitations, of course; the parameters of an Oscillator cannot be pasted to one of the Filters, for example. Here's a chart that shows the possible combinations.

Modules	**Copy/Paste is possible between...**
Oscillators	Oscillators 1 - 8 [1]
Envelopes	Envelopes 1 - 5, Osc 1-8 (envelopes only)
LFOs	LFOs 1 - 5
Effects	Pre-FX, Post-FX
Algorithm	Algorithm [2]

[1] The Direct Out parameter is ignored during a copy/paste between Oscillator 1 and Oscillators 2-8. But all other Oscillator settings are transferred.

[2] This only applies to Multi mode, when attempting to copy the Algorithm between the Upper and Lower parts.

MODULES THAT WON'T

When the Save button is held some of the Module buttons are not lit. These have unique parameters and can not be copied and pasted.

Modules	**Copy/Paste NOT possible...**
Filters	Filter 1, Filter 2
Effects	Delay, Reverb
Algorithm Edit	Algorithm Edit [1]

[1] This only applies to Multi mode, when attempting to copy settings between the Upper and Lower parts.

OSCILLATORS: THE BUILDING BLOCKS

INTRODUCTION

Oscillators are the foundation of a patch. They generate the most basic component of the sound, which is then shaped by other components such as Envelopes, the Filters, and the VCA.

Leviasynth has 8 oscillators per voice. The same waveforms are available for each oscillator, and they can be selected independently. The impact each oscillator can have is largely determined by the current algorithm, which is described in *Algorithms – The Framework (p. 59).*

There are seven Modes available for each oscillator, which means there are that many ways for any oscillator to affect (modulate) the others. The Mode is always available for Oscillators 2-8, but is only visible for Oscillator 1 under certain conditions. The setting is independent per oscillator, and the sound-shaping abilities of each mode are very different. Those are described in *Oscillator Modes (p. 45)*.

The Individual Oscillator Settings and the Oscillator Group Edit modules are known collectively as the Oscillator section. We'll cover the *Oscillator Group Edit (p. 52)* modules in the next chapter; in this chapter our focus is the Individual Oscillator Settings modules.

WHAT ARE CARRIERS AND MODULATORS?

An oscillator can be a carrier, a modulator, or both. But what does that mean?

- A carrier is connected directly to the signal path, and can be affected by one or more modulators (depending on the Algorithm). Think of it as the "ground floor" of the patch.
- A modulator is not tied directly to the signal path; it is heard through the impact it has on other oscillators. A modulator is like one of the "upper stories" of the patch.
- When an oscillator is both a carrier and a modulator, the relationships are more complex: It is connected directly to the signal path, it can be affected by other oscillators (depending on the Algorithm), **and** it can have an impact on other oscillators. The "upper/lower stories" analogy still works, but it's more like an Escher print! Find the details at *Oscillator settings: page 5 (p. 42)*.

An algorithm decides which of those three states an oscillator is in. In a custom algorithm, anything goes! We'll explain these concepts in *Algorithms – The Framework (p. 59)*.

Note: Throughout this chapter and manual we will sometimes abbreviate the word "Oscillator" as "Osc".

OSCILLATOR TIPS

Here are some features that make editing a patch even faster. Keep them in mind as you learn about the Oscillators.

Current Osc LED is brighter

The oscillators are color-coded: Osc 1 is cyan, Osc 2 is green, etc. This is true not only for the Oscillator Settings button LEDs but often in the display as well. If you forget which oscillator you're editing, release the keys and look at the oscillator buttons. The brightest one is the one you selected most recently.

Solo/Mute Oscillator

These soft buttons are present on every Oscillator Settings page. They can help you hear what an oscillator is contributing to the sound. But there are some things to keep in mind:

SOLO

- If the soloed oscillator is a carrier you'll hear it and the impact all of its modulators are having on it.
- If the soloed oscillator is a modulator but is not being modulated by other oscillators, you'll only hear that oscillator.
- If the soloed oscillator is a modulator and is also being modulated by other oscillators (i.e., it's a carrier and a modulator), you'll hear that oscillator along with whatever its modulators are doing to it.

MUTE

- If the muted oscillator is a carrier you won't hear it or its modulators, unless they are connected to the signal path another way.
- If it's a modulator, the amount of change you'll hear depends on how much it is affecting other oscillators.

It's also possible to solo an oscillator inside the Custom Algo Edit page when *Making a Custom Algorithm (p. 62)*.

When an oscillator is both a carrier and a modulator, the changes made by the Solo / Mute buttons depend on the relationships between the oscillators and the signal path, as defined by the current algorithm. Those relationships are explained more fully in *Algorithms – The Framework (p. 59)*.

Oscillator shortcut: Page Recall

The first press of an Oscillator button selects page 1, and pressing it repeatedly selects the other pages. But let's say you're editing a parameter on page 4 and want to do the same for another oscillator. You can jump straight to that same page by holding [SHIFT] and selecting the next oscillator, saving several steps. Remember: When you hold [SHIFT], the silkscreen under a button tells you what will happen when you press that button (PAGE RECALL, in this case).

There is one exception to this shortcut: When you're inside the Keyscale Edit page, this technique jumps to the next-highest level page for the other oscillator (i.e., to Oscillator Settings page 5). See also *Page memory (p. 135)* for a list of exceptions in Multi mode.

Copy / Paste Oscillator settings

As with all identical modules, settings can be copied between the 8 Oscillators: Hold [SAVE], press and release the source, and then press and release the destination. Then release [SAVE]. This technique can be quite a time-saver.

OSCILLATOR 1

Oscillator 1 is identical to Oscillators 2-8 in all ways but one: It doesn't have a *Direct Out (p. 42)* because it doesn't need it; Osc 1 is always connected directly to the signal path. This means it's always a carrier, though it can be a modulator too (see *What are Carriers and Modulators? (p. 36)*). Depending on the algorithm, Osc 1 might not have any modulators at all.

There's another difference you'll see right away: The first parameter on page 1 for each Osc is its Mode. But Osc 1 only shows that parameter when you are creating a custom Algorithm. We'll dive into that in the chapter *Algorithms – The Framework (p. 59)*.

OSCILLATORS 2 - 8

These oscillators can be carriers, modulators, or both, depending on the algorithm. When used as modulators they can act upon other oscillators in one of seven ways, and each oscillator can use a different method. See Oscillator settings: page 1 below.

OSCILLATOR SETTINGS

As mentioned previously, each oscillator has identical parameters except for Direct Out, which Osc 1 does not have. We will describe each parameter, and the descriptions apply equally to each oscillator except as noted.

Oscillator settings: page 1

These are the fundamental settings for each oscillator:

Control	Parameter	Range	Description
1	Mode [1]	Phase Mod, Freq Mod, PW Mod, HTE Sync, PD Square, PD Saw, PD Saw Pulse	Determines how this oscillator affects the ones it is modulating.
2	Waveform	323 options (see *Waveform List (p. 51)* in this chapter)	Choose a waveform to shape or be shaped by other oscillators. Press this soft button again to invert the waveform.
3	Semitone	+/- 36 semitones	Coarse tuning of oscillator pitch. Use [SHIFT] to jump to multiples of 12.
	Ratio [2]	0.25 to 64.00	Coarse adjustment of oscillator ratio. Use [SHIFT] for precision.
	Frequency [3]	0.00 to 10,000.00	Coarse adjustment of frequency value (before the decimal point). Use [SHIFT] for precision.

4	Cent	+/- 50 cents	Fine tuning of oscillator pitch.
	Fine [2]	-50.00 to +100.00	Effective range +/- 1 octave. Hold [SHIFT] for smaller increments.
	Fine [3]	xxxxx.00 to xxxxx.99	Fine tuning of frequency value (after the decimal point).
5	Initial Level	0-128.0	The starting output level of the oscillator. Its envelope can adjust this positively or negatively.
6	Env Level	+/-128.0	How much the dedicated envelope affects the oscillator output level.
7	Feedback [3]	0-100.0	Redirects the output of an oscillator back into itself for a unique form of waveform modulation.
8	Keytrack [5]	+/-200%	Sets keyboard pitch tracking. 0 = fixed pitch; at +/-100% a 1-octave difference on the keyboard changes the pitch by 1 octave. Default = 100%.

[1] Visible for Osc 1 only when *Making a Custom Algorithm (p. 62)*

[2] Visible only when Pitch Mode = Ratio on *Oscillator settings: page 5 (p. 42)*.

[3] Visible only when Pitch Mode = Frequency on *Oscillator settings: page 5 (p. 42)*.

[4] Feedback is visible but doesn't do anything in the PW Mod, HTE Sync, or Phase Distortion modes.

[5] Keytrack is hidden when Pitch Mode = Frequency.

MODE

The Mode setting of an oscillator changes the way other oscillators are affected when it is used as a modulator. It does not affect the oscillator itself, so if it's a carrier it won't sound different when its Mode is changed (but other oscillators might). This is true whether it is a "ground floor" carrier or an "upper story" modulator with Direct Out = On.

Note: Mode is only visible for Osc 1 when creating a custom Algorithm.

In this section we will provide a brief description of each Mode. More extensive descriptions are in the *Oscillator Modes (p. 45)* section.

- **Phase Mod**: The modulator alters the phase of the carrier wave, rather than its frequency.
- **Freq Mod**: The modulator affects the carrier wave by introducing new harmonics to the fundamental pitch.
- **PW Mod**: Also known as Pulse Width Modulation. A classic method of introducing timbral variation by compressing and expanding different portions of a waveform.
- **HTE Sync**: A synthesis technique popularized by analog synthesizers, and used to great effect in the domain of digital oscillators. The Modulator resets the cycle of the Carrier waveform according to the output level and frequency of the Modulator.
- **PD Square**: A form of phase distortion that modulates the playback rate of the carrier wave according to an adjustable binary function.
- **PD Saw**: A form of phase distortion that modulates the playback rate of the carrier wave by applying the trajectory of a saw wave.
- **PD Saw Pulse**: Same as PD Saw, but phase distortion is applied to the playback rate of the carrier first by a sawtooth function, then a binary function.

WAVEFORM

Use Control knob 2 to select the Oscillator waveform. Hold [SHIFT] and turn the Control knob to jump to the first waveform in each waveform group (Sine, Faebear1, RanN1, Salex1, etc.).

Hot tip for sound design: Press soft button 2 to invert the selected waveform. You'll see both waveforms superimposed, with the inverted wave in the Osc color and the original wave in grey. As an added visual clue, the name of the waveform will be inverted too! This also works inside the WAVE module in the

Oscillator Group Edit section.

Press soft button 2 again to restore the original waveform, or turn Control knob 2 to select the next one. Either method will cancel the waveform inversion.

For a list of the available waveforms see the *Waveform List (p. 51)* at the end of this chapter.

SEMITONE / RATIO / FREQUENCY

When Pitch mode = Semitone, Control knob 3 adjusts the pitch of the oscillator by chromatic intervals. Hold [SHIFT] and turn the knob to jump by octaves (12 semitones). The full range is +/- 3 octaves (36 semitones).

You can change the Pitch mode per oscillator on *Oscillator settings: page 5 (p. 42)*. The soft button label on page 1 shows which mode is selected (Semitone, Ratio, or Frequency).

- When set to Ratio the parameter range follows the harmonic series up to the 64th harmonic, plus two sub-harmonic values.
- When set to Frequency the value can be set to a static frequency between 0 and 10 kHz.

The following table illustrates the equivalent octave values for each Pitch mode.

Pitch mode	+3 octaves	+2 octaves	+1 octave	Center	-1 octave	-2 octaves	-3 octaves
Semitone	+36	+24	+12	0	-12	-24	-36
Ratio	8.00	4.00	2.00	1.00	0.50	0.25	0.25 (Ratio) -50 (Fine)
Frequency [1]	1760 Hz	880 Hz	440 Hz	220 Hz	110 Hz	55 Hz	27.5 Hz

[1] Semitone and Ratio change their pitch on every note, but the Frequency setting is fixed; every note has the same pitch.

CENT / FINE

This adjusts the oscillator pitch in smaller increments.

- When Pitch mode = Semitone, the soft button label is "Cent" and the range is +/- 50 cents (half a semitone). Hold [SHIFT] for precise adjustments.
- When Pitch mode = Ratio, the soft button label is "Fine". It has an effective range of +/- one octave, because when a frequency is cut in half (nn.nn:-50.00) the pitch drops an octave, and when it doubles (nn.nn:100.00) the pitch rises an octave. Hold [SHIFT] for smaller increments.
- When Pitch mode = Frequency, the soft button label is "Fine". The range is .00 to .99 Hz, or just under 1 cycle per second. Hold [SHIFT] for precise adjustments. Note: It's harder to detect a difference of 1 Hz in higher frequencies because it's a smaller percentage of the frequency. For example, 50 Hz and 50.99 Hz are more distinct than 4000 Hz and 4000.99 Hz, although the differences are identical.

The Pitch mode can be different for each oscillator. This parameter is found on *Oscillator settings: page 5 (p. 42)*.

INITIAL LEVEL

Control knob 5 sets a minimum level for the oscillator, which the Envelope uses as a starting point. It may help to think of the Initial Level as being similar to the drawbar on an electric organ, and the Envelope as an engineer "riding the fader" on a mixer.

ENV LEVEL

This adjusts the amount of impact the oscillator envelope has on the oscillator level. It uses the Initial Level as the zero point, and can adjust or reduce the oscillator level accordingly.

How Initial Level and ENV Level interact

Here are some concepts to keep in mind:

- Initial Level can be set to zero, in which case the oscillator level is completely controlled by the ENV Level parameter.
- If Initial Level ≠ zero and ENV Level is a positive value, ENV Level works within the remaining range to increase the oscillator level. However, the combined level can't exceed the equivalent of an Initial Level of 128.0.
- If Initial Level ≠ zero and ENV Level is a negative value, ENV Level reduces the oscillator level by that amount according to the Envelope settings. However, it can only reduce the oscillator level to the equivalent of an Initial Level of 0.

FEEDBACK

Control knob 7 feeds the output of the selected oscillator back into itself. At its most extreme

settings it can sound like noise, but it's a very useful way of adding harmonic complexity to an oscillator without modulating it with another oscillator. Try this:

1. Initialize a Single mode patch by pressing [INIT] twice
2. Press [OSC 1]
3. Hold pad 1 and increase the Feedback with control knob 7.

This is just a simple sine wave feeding back into itself, but as the feedback level increases, the result sounds a bit like opening a filter on a sawtooth wave. There is even greater timbral complexity when using two oscillators, one as a carrier and the other as a modulator, and adjusting the feedback on one or both oscillators. See *Example 1: Simple Phase Mod (p. 45)* for a closer look.

Note: The Feedback parameter doesn't do anything in the PW Mod, HTE Sync, or Phase Distortion modes.

KEYTRACK

This controls the relationship between the keys on a keyboard and the pitch of an oscillator. At 100% the oscillator tracks the keyboard normally; i.e., go up an octave on the keyboard and the oscillator goes up an octave too. But depending on what an oscillator is doing, you may want it to sound the same on every note (Keytrack = 0%). Atonal percussive elements are an example of this, such as the hammer noise on a piano. If that's what you're after, the most precise method is to set Pitch Mode = Frequency (see *Oscillator Pitch mode (p. 42)*). Note: Keytrack is hidden when Pitch Mode = Frequency.

You can also invert an oscillator's pitch response with a negative value, with -100% providing a 1-octave drop in pitch for every octave you move upward on the keyboard, and -200% changing twice as much.

Tip: if you hold [INIT] and press the Keytrack button repeatedly, the setting jumps between three different values: 100%, 0%, and -100%.

Note: Keytrack is different from the Keyscale parameter, which adjusts the amplitude of an oscillator in relationship to the note range, not its pitch. We'll explain Keyscale and related parameters in *Keyscale Edit (p. 43)*.

Oscillator settings: page 2

Control knob	Parameter	Range [1]	Description
1	Attack	Speed mode = Fast BPM = Off: 0 ms to 36.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 600 sec BPM = On: 0, 1/4 to 192'	After the delay period, the length of time the envelope takes to reach its full amplitude.
2	Decay	Speed mode = Fast BPM = Off: 0 ms to 60.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 900 sec BPM = On: 0, 1/4 to 192'	After the hold period, the length of time the envelope takes to reach its sustain level.
3	Sustain	0.0 to 128.0	The resting level of the envelope prior to note off.
4	Release	Speed mode = Fast BPM = Off: 0 ms to 60.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 900 sec BPM = On: 0, 1/4 to 192'	The length of time the envelope takes to reach its zero point after note off.
5	Delay	Speed mode = Fast BPM = Off: 0 ms to 32.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 60.0 sec BPM = On: 0, 1/4 to 192'	The length of time before the attack segment begins.

6	Hold	Speed mode = Fast BPM = Off: 0 ms to 36.0 sec BPM = On: 0, 1/4 to 192' Speed Mode = Slow BPM = Off: 0 ms to 600 sec BPM = On: 0, 1/4 to 192'	The length of time between the attack and decay segments.
7	Speed Mode	Fast, Slow	Toggles all segments between two speed ranges.
8	BPM Sync	Off, On	Toggles all envelope segments from sec to synchronized time divisions.

[1] 64' = 16 bars, 192' = 48 bars.

To set the length of an envelope segment quickly: While on page 2, hold [SHIFT] and press the appropriate Control button for the desired length of time. This works with BPM On or Off and whether the Speed Mode is Fast or Slow.

Oscillator settings: page 3

Control knob	Parameter	Range	Description
1	AtkCurve	Exp (-64) > Lin (0) > Log (64)	Defines the curve for the attack segment.
2	DecCurve	Log (-64) > Lin (0) > Exp (64)	Defines the curve for the decay segment.
3	Quantize	(various)	Reduces envelope resolution.
4	RelCurve	Log (-64) > Lin (0) > Exp (64)	Defines the curve for the release segment.
5	Legato	Off, On	When On, an envelope won't reset unless all notes have been released.
6	Reset	Off, On	When On, an envelope is reset when polyphony is exceeded. If Legato = On, Reset is not available.
7	Freerun	Off, On	When On, an envelope will always run from Delay to the Sustain stage (note held) or from Delay through the Release stage (note released).
8	Env Loop [1]	Off, 2-50, Infinite	Toggles the looping feature and defines the number of times the envelope will loop.

[1] For more information, see *Envelope Loop (p. 76)* and *Stage Loop (p. 76)*.

Oscillator settings: page 4

The most basic way to trigger an oscillator envelope is to press and release a pad. But once a voice is active, an oscillator envelope can be triggered by as many as four trigger sources, as shown below.

Note that using the Tap Trigger button does not retrigger the voice, nor does it retrigger the envelope for any other oscillator; i. e., you won't hear what a modulator envelope is doing when a carrier envelope is triggered. But when a voice is active, triggering each envelope with the Tap Trigger button can help you know what each envelope does when a voice is triggered.

Control	Parameter	Range	Description
Knob 1	TrigSrc1	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod in 1, Mod in 2	Selects a trigger source for the envelope.
Knob 2	TrigSrc2	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod in 1, Mod in 2	Selects a trigger source for the envelope.

Knob 3	TrigSrc3	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod in 1, Mod in 2	Selects a trigger source for the envelope.
Knob 4	TrigSrc4	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod in 1, Mod in 2	Selects a trigger source for the envelope.
Knob 5	Velocity Curve	Log (-64) > Lin (0) > Exp (64)	Sets the response curve for the Velocity > ENV setting.
Knob 6	Velocity > ENV	+/- 64.0	Determines the impact velocity can have on the range of the envelope.
Knob 7	Stage Loop [1]	Delay > Attack, Delay > Hold, Delay > Decay	Decides which envelope stages are in the loop.
Button 8	Tap Trigger	—	Tap to trigger the envelope. The sustain stage is ignored.

[1] The envelope loop is toggled and defined on Oscillator settings page 3. For more information, see *Envelope Loop (p. 76)* and *Stage Loop (p. 76)*.

Oscillator settings: page 5

Control knob	Parameter	Range	Description
1	Pitch	Ratio, Semitone	Toggles Oscillator pitch mode between two settings.
2	Direct Out [1, 2]	Off, On	Connects a modulator to the signal path, making it a carrier too.
3	Phase	0-360°	Fine tuning of oscillator starting phase.
4	Keyscale Edit...	(access)	Press Control button 4 to access the settings. (See Wavelist Edit page below.)
5	ENV Source	Self, Env 1-3	Selects an Envelope to sculpt the oscillator output level.
6	Pan [3]	+/- 64.0	Adjusts stereo position of the oscillator when Osc Stereo is enabled.
7	Velocity	+/- 64.0	Sets velocity sensitivity for the oscillator's Initial Level parameter.
8	PolyAT	+/- 64.0	Adjusts per-pad modulation of the oscillator's Initial Level parameter.

[1] The Direct Out parameter is only visible when the Algorithm Mode = Custom. See *Custom Algo Mode (p. 61)*.

[2] Only Oscillators 2-8 have the Direct Out parameter. If an oscillator is already a carrier, this parameter has no effect.

[3] Oscillator Pan is hidden until the Osc Stereo parameter is enabled on *Voice Parameters: page 2 (p. 92)*.

OSCILLATOR PITCH MODE

Use Control knob 1 to select the Pitch mode: Semitone, Ratio, or Frequency. The selection also changes two parameters on *Oscillator settings: page 1 (p. 37)*.

When Pitch Mode is set to...	Page 1 parameters become...
Semitone	Semitone and Cent
Ratio	Ratio and Fine
Frequency	Frequency and Fine

For information about these settings, see *Semitone / Ratio / Frequency (p. 39)* and *Cent / Fine (p. 39)*.

DIRECT OUT

Note: This parameter is only available when you are making a custom algorithm. The details are in *Custom Algo Mode (p. 61)*.

When you enable Direct Out for an oscillator, it does more than add the sound of the selected waveform of that Oscillator; it lets you hear how that Oscillator sounds after it has been acted upon by other oscillators. In other words, when Direct Out = On the Osc becomes a carrier, tied directly to the audio output path, able to be modulated by other oscillators, while also retaining its potential as a modulator for other oscillators.

For example, if Osc 5 has its Mode = FM and it is modulating Osc 4, enabling the Osc 4 Direct Out does not provide the raw waveform of Osc 4; it provides the output of Osc 4 after Osc 5 has applied FM to it. Oscillator 4, in turn, can still apply FM or another process to Osc 3, etc.

There are a couple of things to remember about the Direct Out parameter:

- Osc 1 is the only oscillator that does not have a Direct Out parameter. It is always connected to the output path.
- If an oscillator is already a carrier, enabling the Direct Out parameter makes no difference to its output level.

PHASE

An oscillator doesn't need to start at a zero-crossing point. The Phase parameter lets you specify the exact point at which it will begin, as measured in degrees from zero to 360.

Believe it or not, the easiest way to visualize this is to look at an LFO! You don't even have to play a note.

Phase fundamentals

1. Initialize a patch in Single mode, then press [LFO 1] twice and view the display.

   The sine wave starts in the middle of the grid. That is the zero-crossing point **and** *the starting point for the waveform.*

2. Adjust the Phase with Control knob 5 until it reaches 90°.

   The sine wave now starts at its peak.

3. Adjust the Phase again until it reaches 180°.

   The sine wave starts at the zero crossing point, but goes negative instead of positive as in step 1.

4. Adjust Phase to 270° (the "trough") and finally 360°. The waveform matches step 1: zero-crossing, positive-going.

   As proof, hold [INIT] and press Phase.The value resets to 0°, but the waveform stays in the same position.

But how does it sound? The first thing to know is that you probably won't hear a difference if you listen to one oscillator and adjust its phase. You need to pit two matching oscillators against each other.

1. Initialize a patch in Single mode, press [OSC 1], and change its Waveform to Saw.
2. Hold [SAVE] until after step 3.

   We're going to do that "module copy" thing we learned about in the previous chapter.

3. Press [OSC 1] to select it as the copy source, then press [OSC 2] to select it as the destination.

   Release all buttons. Those two oscillators now have identical settings.

4. Play a pad. 2 oscillators are playing the saw waveform and starting it at the same point.
5. Hold [SHIFT] and press the down arrow to reach page 5 of Osc. 1.
6. Hold pad 1 and adjust the Phase to 90°.

   There is no change, because the new phase setting only takes effect when you retrigger the note.

7. Retrigger the note. Now there are 2 distinct peaks in the Saw wave and the sound is different.

   In technical terms, the two waveforms are 90° out of phase.

8. Change the phase to 180° and retrigger the note. The sound is an octave higher. (Wait, what?)

   The waveforms are 180° out of phase, and their fundamental frequencies canceled each other. Only some harmonics remain.

9. Hold [SHIFT] and adjust the phase to 185°, play a note, then 190° and play a note, etc.

   Gradually the fundamental frequency returns as the phase relationship of two waveforms changes.

Results vary with different waveforms. Simpler waveforms like Sine or Square completely cancel themselves in step 8. But Saw and Pulse 1 don't, for example, because there is minimal overlap in their harmonic structures.

KEYSCALE EDIT

Keyscale is different from the *Keytrack (p. 40)* parameter, which adjusts the pitch of an oscillator in relationship to the note range. The Keyscale parameter adjusts its amplitude instead:

- It lets you reduce the output of an oscillator as the notes go higher, to tame its input to the carrier wave. This can help prevent unwanted harshness or aliasing. (It can do the same thing to the direct output of a carrier, if you like.)
- It can also increase the oscillator output above or below a designated note; i.e., the breakpoint. We'll explain Keyscale and Breakpoint in this section.

Press soft button 4 to access the Keyscale Edit page. This lower-level page has 5 parameters:

Control knob	Parameter	Range	Description
4	Breakpoint	C-1 to G9	Sets center point of Keyscale; adjustments can be made above and below this point.
5	Lower Depth	0-100%	The amount the Oscillator level will decrease below the breakpoint. 100% is "flat", with no cut or boost; values below 100% decrease the Oscillator level.
6	Lower Curve	Exp (-64) > Lin (0) > Log (64)	Defines the positional curve the output adjustment follows below the breakpoint.
7	Upper Curve	Exp (-64) > Lin (0) > Log (64)	Defines the positional curve the output adjustment follows above the breakpoint.
8	Upper Depth	0-100%	The amount the Oscillator level will decrease above the breakpoint. 100% is "flat", with no cut or boost; values below 100% decrease the Oscillator level.

ENV SOURCE

Control knob 5 lets you choose whether the oscillator output level will follow its own envelope or follow the contours of one of the three main envelopes: Env 1 (Digital Filter), Env 2 (Analog Filter), or Env 3 (VCA). For an example of how this works, see *Example 1: Classic Sync (p. 49)*.

When an Oscillator Envelope has the ENV Source set to Env 1-3 (Filter 1, 2, or VCA), the Bias controls no longer control it. They affect the Oscillator Envelopes, not Envelopes 1-5.

PAN

This parameter is only visible when Osc Stereo is enabled on *Voice Parameters: page 3 (p. 93)*. When that's the case, the first thing to know is that polyphony is cut in half, from 16 to 8 voices in Single mode (or from 8 voices to 4 for a part inside a Multi). This is because each voice is mirrored on the left and right outputs so it can be processed as a single stereo voice.

There are three possible outcomes as the stereo voice is panned to the left or right. These depend on the Osc Stereo setting:

- Carrier Only: Panning only affects the carriers in the algorithm. The stereo modulators are not affected by the pan position. Since a modulator can be linked to more than one carrier, depending on the algorithm, this means the modulation is applied evenly to each carrier regardless of the stereo position of each carrier oscillator.
- Mod Only: Panning only affects the modulators in the algorithm. The stereo carriers are not affected by the pan position. This means a single stereo carrier could be modulated in different amounts throughout the stereo field, with the most extreme example being that it produces one waveform in the left output and a completely different waveform in the right output.
- Both: Panning affects the carriers and the modulators in the algorithm.

Again, those settings are found on *Voice Parameters: page 3 (p. 93)*, along with the Carrier Detune parameter. These settings can be different for every patch. For information about these and other Voice module parameters, see *The Voice Module (p. 89)*.

VELOCITY

This parameter provides velocity sensitivity for the Initial Level parameter. So if you're using any or all oscillators as "organ drawbars" as described in *Initial Level (p. 39)* but also want velocity sensitivity, adjust this parameter for each of those oscillators.

Explanation: Velocity + Velocity > ENV

These parameters have similar names but meet different needs.

- **Velocity > ENV (page 4)**: This modulates the Osc. ENV level parameter. It is equivalent to the Velocity > ENV parameter on page 3 of ENV 1-5. See *Envelope parameters: page 3 (p. 76)*.
- **Velocity (page 5)**: This modulates the Initial Level parameter.

This example takes a while, but it shows how to use velocity to control each oscillator separately.

1. INIT Single mode
2. Press [OSC 1]
3. Hold [SHIFT] and press Down arrow to reach page 5
4. Release [SHIFT] and press Up arrow to reach page 4
5. Play the same note repeatedly while changing Velocity > ENV to 64. It does nothing. Why not?

This is because the initialized state of Osc. 1 has Env level at 0 and Initial level at 128.

6. Initialize the Velocity > ENV value (hold [INIT] and press soft button 6).
7. Use the Down arrow to reach page 5.
8. Play the same note repeatedly while changing Velocity to 64. The output level decreases to make headroom for the velocity response. Try different velocities as proof.
9. Init Velocity to return its value to 0.
10. Hold [SHIFT] and press Up arrow to reach page 1.
11. Set Initial Level to 0 and ENV Level to 128.
12. Repeat steps 3-5. Now there is velocity response, because Velocity > ENV has headroom to do its job.
13. INIT Velocity > ENV, then adjust it to -64 while playing. This inverts the velocity response of the Osc. Envelope.
14. Repeat steps 1-3 to reach page 5.
15. Adjust Velocity to -64 while playing. This inverts the velocity response for Initial Level.

Every oscillator has those two parameters, so follow those steps as needed to adjust the velocity sensitivity for each component of the building blocks in the sound.

POLYAT

This lets Polytouch® control the level of an oscillator. It can bring the oscillator level up, even with Initial Level and ENV Level set to 0. It also can be set negatively, so it can reduce the oscillator level on a per-note basis.

Options abound: You could use this parameter to bring in a high-pitched modulator, or to reduce the output of an entire stack of oscillators, or whatever you can dream up.

OSCILLATOR MODES

Osc 2-8 have a Mode parameter, and each oscillator can be set to any one of the 7 modulation types. (Osc 1 also has this, but it isn't always visible; see the next section). But an oscillator's Mode setting does nothing to that oscillator; it decides how that oscillator will affect the others.

We used the analogies of "ground floor"and "upper stories" earlier; see *What are Carriers and Modulators? (p. 36)*. We'll develop that concept further in *Algorithms – The Framework (p. 59)*.

The modes can use any of Leviasynth's formidable collection of waveforms, though each mode handles them differently. For a list of the available waveforms see the *Waveform List (p. 51)* at the end of this chapter.

Osc 1 has a Mode?

Oscillator 1 also has the Mode parameter, but it is only visible under one condition: when the patch contains a custom algorithm. None of the preset algorithms use Oscillator 1 as a modulator, only as a carrier. But when the Algorithm Mode is set to Custom, it becomes possible to use Oscillator 1 to modulate the other oscillators. That's when the Mode parameter shows up on page 1, edit field 1 of the Osc 1 module. We'll learn about making a custom algorithm in *Algorithms – The Framework (p. 59)*.

Phase Modulation (Phase Mod)

With this mode the modulator adjusts the phase of the carrier, not its frequency. The differences can be extreme, especially when complex waveforms are involved. See the next section for a contrast of the two modes.

Frequency Modulation (Freq Mod)

This mode provides a type of synthesis known as Linear FM (Frequency Modulation). With Freq Mod, a modulator alters the carrier waveform by superimposing its harmonic structure on that of the carrier.

But unlike a famous synth from the 1980s, which only had sine wave oscillators, Leviasynth can use any of its waveforms in either position.

Phase Mod vs. Freq Mod

Okay, so technically that "famous synth from the 1980s" was Phase Modulation, not FM. Phase Mod is less CPU-intensive, which was a much bigger issue back then. And since that synth only used sine waves, it worked out well. It's hard to tell the difference between Phase Mod and Freq Mod using sine waves, and the unit was more affordable as a result.

The difference becomes more obvious when using more complex waveforms. For the following examples you'll want to see the Oscilloscope, so if it isn't already enabled, you can do so on System > Display Settings > soft button 1.

EXAMPLE 1: SIMPLE PHASE MOD

1. Select Single mode and press INIT twice.
2. Press [ALGO EDIT]

   All oscillators are below the dotted line, so they are carriers.
3. Use the Algorithm knob or Control knob 1 to select algorithm 02.

Osc 2 is placed above the line. It is now a modulator for Osc 1.

4. One at a time, press the [OSC 1] and [OSC 2] buttons while watching the display. There are two differences:
   - The Initial Level parameter for Osc 1 is set to 128.0; Osc 2 is set to 0.
   - Osc 2 has a Mode parameter in the upper left hand corner (edit field 1).
5. Press [ARP LATCH] to activate the note latch feature.

   You can hold a note manually if you prefer, but it's best to have both hands free.
6. Press the Octave Down button, then select Osc. 2 and play pad 1.

   Notice the sine wave in the display.
7. Raise the Initial Level parameter gradually from 0 to 128 and back to 0.

   Observe how the shape of the waveform changes in the display.
8. Raise the Initial Level parameter again to about 100.0.
9. Raise the Feedback parameter gradually from 0 to 100%.

   Observe the difference in the waveform and sound.
10. Spend some time adjusting the Initial Level and Feedback parameters to see how each contributes to the overall sound.

This experiment should give a taste of how powerful Phase Mod can be. You can do a lot with 2 oscillators, and there are 6 more!

But for now we'll limit ourselves to 2 oscillators to learn about these modes.

EXAMPLE 2: PHASE MOD VS. FREQ MOD

We'll assume you worked through the previous example so we can reduce the narration between the steps.

1. Select Single mode and press INIT twice.
2. Use the Algorithm knob to select 02.
3. Press [OSC 2].
4. Press the Octave Down button, then press [ARP LATCH] and play pad 1.
5. Raise the Initial Level parameter to about 100.0
6. Change Osc. 2 Mode between Phase Mod and Freq Mod.

   There isn't much difference yet, because we're only using sine waves.
7. Change Osc. 2 Waveform to Triangle and repeat step 6.

   You'll hear a large difference now between the Phase Mod and Freq Mod modes.

The difference between Phase Mod and Freq Mod is quite large in step 7, even with a basic Triangle wave as the modulator. The differences become more extreme with complex waves like Klangor1 or Chendom3.

These were simple examples with 2 oscillators. Imagine what could happen with all 8 oscillators working together! If you'd like more examples, head over to *Algorithms – The Framework (p. 59)*.

How do the Pitch modes work?

The Pitch mode parameters are on page 5 of the Individual Oscillator Settings, and also on page 2 of the Pitch module in the Oscillator Group Edit section. The modes are Semitone, Ratio, and Frequency. We'll cover the first two in the next section, and Frequency after that.

PITCH MODE: SEMITONE AND RATIO

These adjustments are expected for certain types of synthesis, like Phase Mod and Freq Mod. But it's unusual for PW Mod and HTE Sync to have these parameters. What it does for these modes is let you control how many times those processes happen during a single waveform cycle, instead of happening only once per cycle as with other synthesizers. It may help to think of it like this:

- With Semitone = 0 (or Ratio = 1.00) there is one process for each cycle of the wave.
- With Semitone = +12 (or Ratio = 2.00) there are two processes for each cycle of the wave.

In the latter case the PW Mod happens twice in a cycle instead of once (the way "normal" Pulse Width Modulation does). HTE Sync (i.e., oscillator sync) happens twice in the cycle.

The wide range of each Pitch mode means the process can happen as many as 64 times in the space of one waveform cycle, or as few as one time in the space of *eight* waveform cycles.

The following table illustrates the equivalent values for the other two Pitch modes. ("8x" means "8 processes in one cycle", etc.)

Pitch mode	8x	4x	2x	1x	0.50x	0.25x	0.125x
Semitone	+36	+24	+12	0	-12	-24	-36
Ratio	8.00	4.00	2.00	1.00	0.50	0.25	0.25 (Ratio) -50 (Fine)

We'll refer back to this section as we explain the next two oscillator modes.

PITCH MODE: FREQUENCY

This pitch mode is completely different from Semitone and Ratio. When an oscillator has its Pitch mode set to Frequency, it is locked to that frequency and does not change when you play higher or lower notes (unless forced to change by a Mod route). This lets you use an oscillator for a specific purpose across the note range. For example:

- Set two or more oscillators to specific frequencies for an independent, complex sound that does not change (e.g., the "thunk" of a hammer, a metallic hit, etc.), while building a sound with the other oscillators that tracks the pitch across the note range.
- Route a modulator through a super-low fixed-frequency carrier for versatile wave shaping. Try changing the waveform, phase offset and feedback of either oscillator in this scenario.

The Pitch mode: Frequency range is 0 Hz (no motion) to 10,000 Hz.

PW Mod

PW Mod (Pulse Width Modulation) lets the modulator alter the basic shape of the carrier waveform by shifting its internal structure over time, making some areas narrower and others wider. This is normally only heard with square waves, but Leviasynth can apply PW Mod to any of its waveforms.

Control knob	Parameter	Range	Description
2	Waveform	—	Irrelevant. Modulation is based on frequency, not waveform shape.
3	Semitone / Ratio	[1]	How many times PW Mod happens in a single cycle.
	Frequency	[1]	How many times PW Mod happens per second.
4	Cents / Fine	[1]	Adjust Semitone / Ratio in smaller increments.
5	Initial Level	[1]	The starting pulse width for the carrier wave.
6	ENV Level	[1]	How much pulse width can be changed by the Osc. envelope.
7	Feedback	[2]	The Feedback parameter is not active in PW Mod mode.
8	Keytrack [3]	[1]	The amount of change to Osc. frequency based on note number.

[1] See *Oscillator settings: page 1 (p. 37)* for the list of values.

[2] The Feedback parameter is not active in this mode.

[3] Keytrack is hidden when Pitch Mode = Frequency.

EXAMPLE 1: CLASSIC PW MOD

In steps 1-7 we'll adjust the pulse width manually, then in steps 8-14 we'll set up an LFO to do it for us.

1. Select Single mode and press [INIT] twice.
2. Turn the Algorithm knob and select algorithm 02.
3. Press [OSC 1] and select the Square waveform.
4. Press [OSC 2] and set its Mode to PW Mod.
5. Press [LEVEL] in the Oscillator Group Edit section.
6. Press the Octave Down button, then hold pad 1 and watch the display.
7. Slowly adjust Osc 2 Initial Level with Control knob 2.

   The square wave narrows and sounds more nasal. When it reaches 128 the square wave disappears.
8. Set Osc 2 Initial Level to 50.
9. Press [LFO 1] and set its Rate to 0.30 Hz.
10. Hold [LFO 1] and press [OSC 2] to set up a Mod route.

    Osc. 2 Initial Level is the default destination, which lets us automate what we did in step 7.
11. Set the Mod route value to 50.0 with Control knob 6.
12. Press [EXIT] before you proceed to step 13!

    Otherwise you'll change the Mod route.

13. Press [LEVEL], press pad 1, and watch the display.

    The pulse width of the square wave changes evenly.

14. Still holding pad 1, adjust Osc 2 Initial Level slowly to 80.

    The square wave disappears and returns. The PW Mod is reaching 100%, as in step 7.

EXAMPLE 2: ATYPICAL PW MOD

This example will take us beyond the PW Mod capabilities of most synthesizers. If you skipped *How do the Pitch modes work? (p. 46)* you may want to review it. It explains how the Semitone / Ratio parameter affects the PW Mod mode.

Let's try a Ratio value of 2.00 in this example.

1. Select Single mode and press [INIT] twice.
2. Select algorithm 02.
3. Press [OSC 1], hold [SHIFT], and turn Control knob 2 to select SyncLav1.
4. Press [OSC 2] and set its Mode to PW Mod.
5. Hold [SHIFT] and press the Down arrow to reach page 5.
6. Change the Pitch mode to Ratio and set Phase to 270°.
7. Press [PITCH] in the Oscillator Group Edit section.
8. Set Osc 2 Ratio to 2.00 with Control knob 2.
9. Press [LEVEL] and watch the display.
10. Press the Octave Down button, hold pad 1, and slowly adjust Osc 2 Initial Level with Control knob 2.

    High-frequency content shifts to the right, narrowing the pulse width.

11. Set Osc 2 Initial Level to 50.
12. Hold [LFO 1] and press soft button 2 to set up a Mod route.

    You should see Osc 2 Initial Level as the destination. This lets us automate what we did in step 10.

13. Set the Mod route value to 50.0 with Control knob 6.
14. Press [EXIT] before you proceed to the next step!

    Otherwise you'll change the Mod route.

15. Press [LFO 1] and set its Rate to 0.30 Hz.
16. Press [LEVEL], hold pad 1, and watch the display.

    The pulse width of the waveform changes evenly.

17. Still holding pad 1, adjust Osc 2 Initial Level slowly to 80.

    High-frequency content disappears and returns. The PW Mod is reaching 100%.

18. Repeat steps 1-10 and try other waveforms.

By now you may have reached the same conclusion we did: PW Mod can change waveforms you've never heard into waveforms *no one* has ever heard.

HTE Sync

Oscillator Sync is a classic analog synthesizer technique where an oscillator is forced to reset with each cycle of another oscillator. Traditionally this is done with simple waveforms, and with the second oscillator affecting the first. Leviasynth provides many more options, including the use of any waveform for the carrier, and the ability for the "higher-story" modulators to affect the modulators beneath them, which in turn affect the carrier.

Control knob	Parameter	Range	Description
2	Waveform	—	Irrelevant. The sync process is based on frequency, not waveform shape.
3	Semitone/Ratio	[1]	How many times HTE Sync happens in a single cycle.
	Frequency	[1]	How many times HTE Sync happens per second.
4	Cents / Fine	[1]	Adjust Semitone / Ratio in smaller increments.
5	Initial Level	[1]	The starting sync amount for the carrier wave.
6	ENV Level	[1]	How much sync amount can be changed by the Osc envelope.
7	Feedback	[2]	The Feedback parameter is not active in HTE Sync mode.
8	Keytrack [3]	[1]	The amount of change to Osc. frequency based on note number.

[1] See *Oscillator settings: page 1 (p. 37)* for the list of values.

[2] The Feedback parameter is not active in this mode.

[3] Keytrack is hidden when Pitch Mode = Frequency.

EXAMPLE 1: CLASSIC SYNC

In steps 1-7 we'll sweep the sync level manually. In steps 8-15 we'll have an Envelope do it, in pursuit of an iconic synth pop sound. So, let's go...

1. Select Single mode and press [INIT] twice.
2. Press [OSC 1] and select the Square waveform.
3. Turn the Algorithm knob and select algorithm 02.
4. Press [OSC 2] and set its Mode to HTE Sync
5. Press [LEVEL] in the Oscillator Group Edit section.
6. Press Octave Down twice, hold pad 1, and watch the display.
7. Slowly adjust Osc 2 Initial Level with Control knob 2.

   The square wave harmonics sweep in a familiar way.
8. Set Osc. 2 Initial Level to 75.

   We're going to do some fancy stuff next.
9. Press Analog Filter and set Cutoff = 50, Env 2 Amt = 64.
10. Press [ENV 2] and set Decay = 896 ms with Sustain = 0.
11. Press [ENV 3] and set Decay = 1.28 Sec with Sustain = 10.
12. Press [OSC 2], then use [SHIFT] + Down arrow to reach page 5.
13. Play pad 1 and listen.

    The tone is static because there are no Osc. Env settings.
14. Keep triggering the note while changing the ENV Source with Control knob 5.
15. Settings of Env 2 and Env 3 cause Osc 2 to use the Env settings from steps 10 and 11.

    That's one way to sculpt the oscillator level. Use the dedicated Osc. Envelope for maximum flexibility.

EXAMPLE 2: ATYPICAL SYNC

This example will take us beyond the oscillator sync capabilities of most synthesizers. If you skipped *How do the Pitch modes work? (p. 46)* you may want to review it. It explains how the Semitone / Ratio parameter affects the HTE Sync mode.

We're going to try different Ratio values in this example.

1. Select Single mode and press [INIT] twice.
2. Turn the Algorithm knob and select algorithm 02.
3. Press [WAVE] the Oscillator Group Edit section.
4. With Control knob 1, set Osc. 1 waveform to Square.
5. Press [OSC 2] and set its Mode to HTE Sync.
6. Hold [SHIFT] and press the Down arrow to reach page 5.
7. Change the Pitch mode to Ratio.
8. Press [PITCH] and set Osc 2 Ratio to 2.00.
9. Press Octave Down twice, press [LEVEL], then hold pad 1 and watch the display.
10. Slowly adjust Osc 2 Initial Level with Control knob 2.

    The harmonic sweep covers a different range than in Example 1.
11. Repeat steps 8-10 with Osc 2 Ratio settings of 0.50, 3.00, etc.

    The harmonic sweep covers a different range each time.
12. Try different Osc 1 waveforms as you repeat steps 8-11.

    Carrier waveforms with complex harmonic content yield very different results.

Overview: PD Mod Modes

Phase distortion is another popular form of synthesis from the 1980s. Leviasynth provides 3 variations (PD Square, PD Saw, and PD Saw Pulse). Each type operates on a similar concept, so in this section we'll describe what they have in common.

First, let's define what a waveform is: the shape of a sound as it changes over time. If you change the start point of the waveform, you have changed its phase. This doesn't change the shape of the waveform, just the point at which it begins. All the component frequencies present in the waveform have the same relationship in time, so the phase has not been distorted.

What phase distortion does is play back the waveform faster in some areas and slower in others, which changes the relationships between the component frequencies. Visually, it looks like the contents of the waveform are shifted increasingly to one side (i.e., its phase has been distorted). The characteristics of this shift are defined by the selected shape (square, saw, or

a combination of each). Note that these are mathematical functions that are being applied to the playback rate, not audio waveforms per se.

For example, here's how PD Saw works: the playback rate of the carrier oscillator speeds up and then slows down suddenly within each cycle of the waveform. The Osc Level parameters adjust the intensity of this speed-up and slow-down effect.

Control knob	Parameter	Range	Description
2	Waveform	—	Irrelevant. Modulation is based on frequency, not waveform shape.
3	Semitone / Ratio	[1]	How many times Phase Distortion (PD) happens in a single cycle.
	Frequency	[1]	How many times PD happens per second.
4	Cents / Fine	[1]	Adjust Semitone / Ratio in smaller increments.
5	Initial Level	[1]	The starting amount of phase distortion of the carrier wave.
6	ENV Level	[1]	How much phase can be distorted by the Osc envelope.
7	Feedback	[2]	The Feedback parameter is not active in any of the PD modes.
8	Keytrack [3]	[1]	The amount of change to Osc frequency based on note number.

[1] See *Oscillator settings: page 1 (p. 37)* for the list of values.

[2] The Feedback parameter is not active in this mode.

[3] Keytrack is hidden when Pitch Mode = Frequency.

PD Square

The playback rate of the waveform transitions suddenly between fast and slow within each cycle of the waveform. The Osc Level parameters adjust the difference between the fast and slow playback rates.

PD Saw

As mentioned in the Overview above, the playback rate of the waveform speeds up and slows down suddenly within each cycle of the waveform. The Osc Level parameters adjust the range of the playback rate alterations.

PD Saw Pulse

The Saw and Pulse shapes are applied back-to-back as a single complex mathematical construct (i.e., Saw then Pulse, Saw then Pulse, etc.). This “super waveform” is then used to manipulate the playback rate of the connected carrier oscillator. This method of phase distortion speeds up and slows down twice within a single cycle, with each alteration of speed following a different path.

WAVEFORM LIST

Waveform group	Waveforms	Waveform group	Waveforms
Classic	Sine, Triangle, TriSaw, Saw, Square	Klangor	Klangor 1-5
Blended Waves	Faebear 1-4	Induct	Induct 1-3
Bent Sine	RanN 1-11	Scorpio	Scorpio 1-9
Skewed Triangles	Salex 1-7	Belview	Belview 1-5
Filtered Waves	Hunter 1-3	Chendom	Chendom 1-8
Triangles	Calishuri 1-6	Glefan	Glefan 1-7
TriangleWidth	Squad 1-5	Sqarbel	Sqarbel 1-2
Analog Combo	Spotgwen 1-5	Obob	Obob 1-3
Modern Combo	PepnoSee 1-4	Ingvay	Ingvay 1-3
TriSawRamp	Artrex 1-6	Particl	Particl 1-3
Bent Ramps	Olliecut 1-3	Vokz	Vokz 1-6
Skewed Ramps	Rampadam 1-7	Flux	Flux 1-5
Modern Saws	Rodimi 1-8	Alweg	Alweg 1-8
Traditional Ramps	JenRamp 1-4	Tronic	Tronic 1-6
Hollow Waves	Hollow 1-3	Duotone	Duotone 1-6
Dull Pulses	Switch 1-11	Bobanab	Bobanab 1-4
Modern PW	ModernPW 1-21	Melotic	Melotic 1-7
Traditional Pulses	Kinetic 1-19	Cluster	Cluster 1-8
Pulse	Pulse 1-6	Micoten	Micoten 1-5
Horizon	Horizon 1-8	Orland	Orland 1-8
SyncLav	SyncLav 1-5	Neuton	Neuton 1-7
Esquire	Esquire 1-4	Xfer	Xfer 1-7
ChriMey	ChriMey 1-6	Resyn	Resyn 1-4
Spect A	Spect A 1-7	Sano	Sano 1-4
Spect X	Spect X 1-7	SquRoo	SquRoo 1-15

OSCILLATOR GROUP EDIT

This area of the top panel has 12 buttons that serve as shortcuts to the most frequently used Oscillator parameters. The difference between these and the Individual Oscillator Settings buttons is:

- Individual Oscillator Settings lets you focus on one oscillator at a time. You can view and edit up to 8 parameters per page, but only for the selected oscillator. We'll also use the term "Oscillator Settings" to refer to these buttons.
- Oscillator Group Edit shows you one parameter at a time, so you can view and edit that parameter for all 8 oscillators at the same time.

THINGS TO KNOW

The Oscillator Group Edit section can make the patch creation process much faster. Here are a few concepts to help you make the most of it:

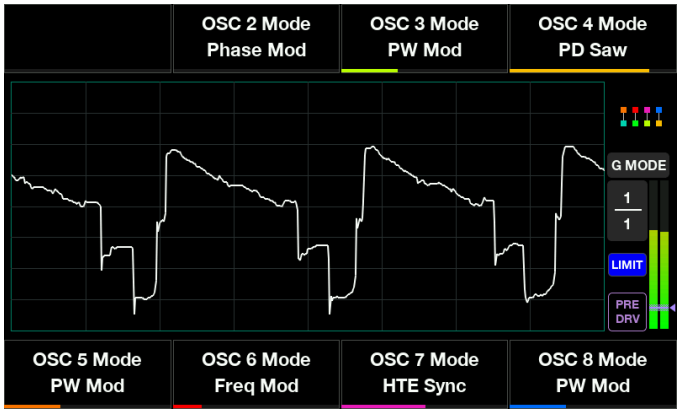
- Some Oscillator Group Edit modules have multiple pages: Pitch, Feedback, Level, Attack, Decay, and Release. Press the button repeatedly to change the page, or use the Page Up / Down arrows.
- The other modules have one page: Mode, Wave, Fine, Delay, Hold, and Sustain.
- When you edit a parameter here, the value also changes on the appropriate Oscillator Settings page.

Be sure to check the end of the chapter for some useful *Quick tricks (p. 54)*.

TOP ROW: MAKING WAVES

The top row of Oscillator Group Edit buttons provides access to the foundational components of your sound. Each one plays an important role in the creation of waveforms.

Mode

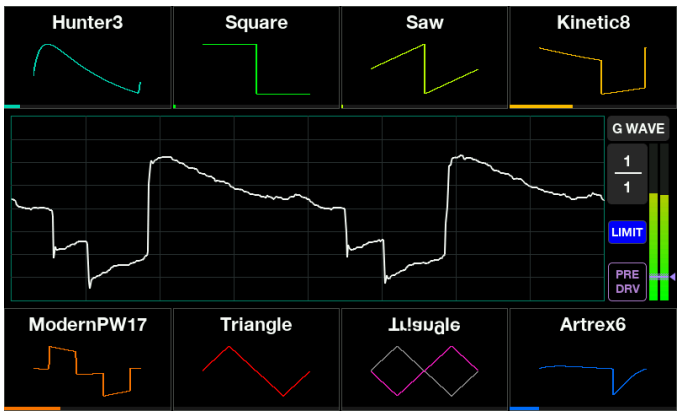


Here we see the mode setting of each oscillator. The mode determines how upper story oscillators affect the lower story oscillators. For an explanation of what we mean by upper and lower stories, see *What are Carriers and Modulators? (p. 36)*.

Things to remember about the Mode setting:

- Soft button / edit field 1 may be blank, because Osc 1 only has a mode parameter when Algo Edit Mode = Custom.
- If an Osc is only used as a carrier (i.e., it's on the "lower story" of the patch), changing the Mode has no impact on the sound of that oscillator.

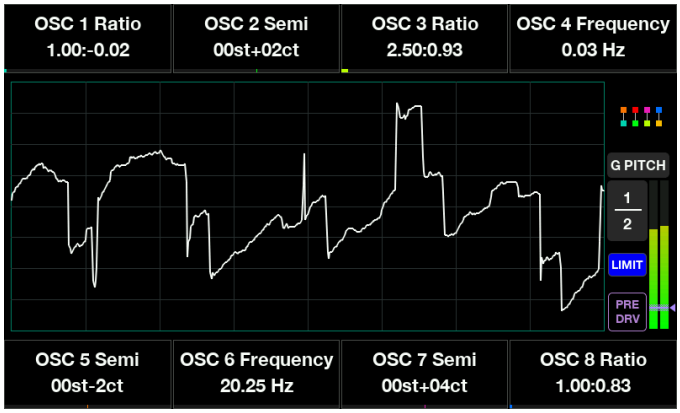
Wave



This page lets you view and select the waveforms for each oscillator. Hold [SHIFT] + turn the appropriate Control knob to jump between waveform groups. See the *Waveform List (p. 51)* for a list of the available waveforms.

Press the soft button of a specific Oscillator to invert its waveform. The graphics and the waveform label tell you at a glance when a waveform is inverted.

Pitch

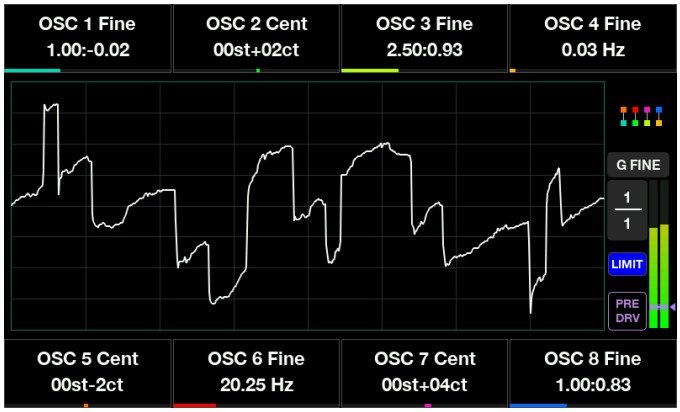


This page reveals the relative tuning of the Oscillators. You'll know instantly what the Pitch mode of an Osc is, because in the top line of the soft button the word "Semi", "Ratio", or "Freq" appears next to the oscillator number.

Press [Pitch] again to view and change the Pitch Mode for any oscillator.

Remember, if the Osc is set to Semitone you can hold [SHIFT] + turn the appropriate Control knob to jump by Octaves.

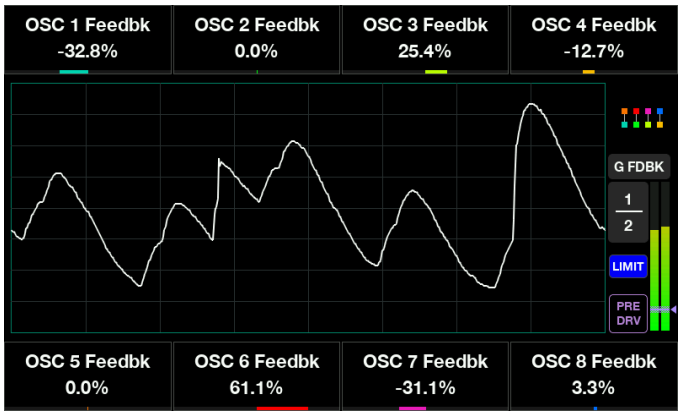
Fine



This page lets you adjust the Fine tuning value for each oscillator. If an Osc is set to Semitone, the soft button label shows the word "Cent" next to the oscillator number. If an Osc is set to Ratio or Frequency, the soft button label shows the word "Fine" instead.

When an Osc is set to Semitone you can hold [SHIFT] + turn the appropriate Control knob to change the value in smaller increments.

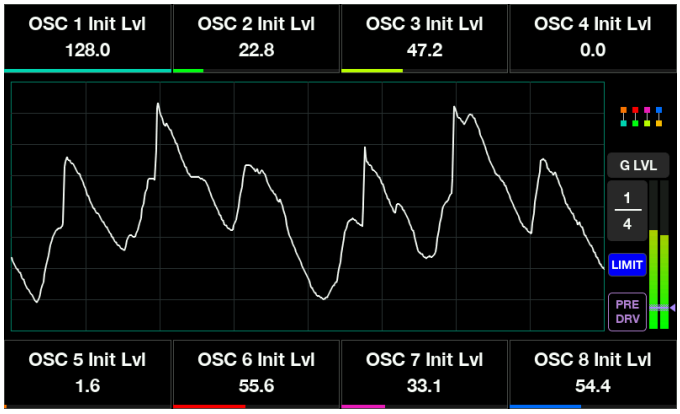
Feedback, Phase



This is where the feedback and phase settings for each oscillator can be adjusted. If the edit field is blank, it's because the oscillator is a modulator and its Mode = PW Mod, HTE Sync, or one of the Phase Distortion modes. The Feedback parameter is hidden for those oscillators unless they are being used as a carrier, or are being used as a carrier and a modulator in a custom algorithm.

Press [FEEDBK] again to view and alter the oscillator Phase.

Level

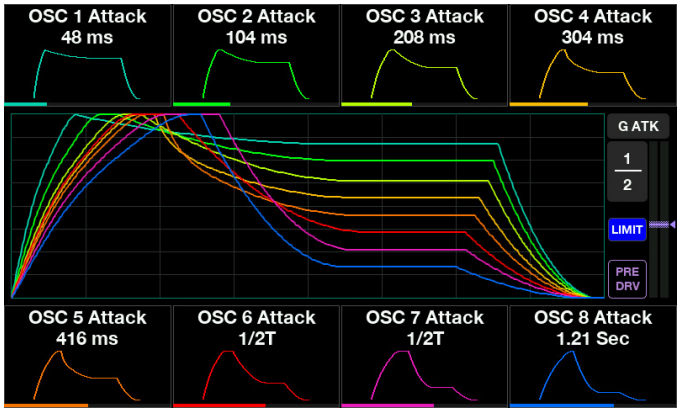


This is the only Oscillator Group Edit module with 3 pages: Osc. Initial Level, Osc. Envelope Level, and Osc. Mute. You can cycle through them by pressing [LEVEL] repeatedly, or by using the Page Up / Down arrows as you would with any other module.

Here are some things to know about these pages:

- Initial Level is the starting point for the oscillator output level. The Envelope level adds to that level or subtracts from it, depending on whether the Envelope is positive- or negative-going.
- A positive value for the Envelope level adds to the Initial Level, and a negative value subtracts from it. It isn't possible to exceed the minimum and maximum output levels, so if it seems like an envelope doesn't follow the defined shape, make sure the numbers add up to something within the range of +/- 128.
- Osc. Mute status can be toggled between On and Off by tapping the soft button.

BOTTOM ROW: ENVELOPE SEGMENTS



The bottom row of Oscillator Group Edit buttons provides easy access the main Envelope parameters for each oscillator. Here you can adjust all eight attack settings on the same page, for example, or all eight sustain levels.

Note: These buttons do not access parameters for the main Envelopes. There are other buttons and a dedicated chapter for those: see *The Envelopes (p. 73)*.

Envelopes on display

One of the best things about selecting any one of these modules is that you can view all of the envelopes at the same time in the middle of the display. Here the color-coding of each oscillator is even more useful: when you make a change you'll know which segment is being adjusted, and for which envelope, as the color-coded envelope graphic shifts to accommodate the new value.

Are all ENV parameters here?

Below is a list of the Oscillator Envelope segments with a dedicated button in the Oscillator Group Edit section. Not all Oscillator Envelope parameters are available here; for that you need to explore the Individual Oscillator Settings section (see *Oscillator settings (p. 37)*).

- Delay: The length of time before the attack segment begins
- Attack: After the delay period, the length of time the envelope takes to reach its full amplitude. Press again to set the curve.
- Hold: The length of time between the attack and decay segments
- Decay: After the hold period, the length of time the envelope takes to reach its sustain level. Press again to set the curve.
- Sustain: The resting level of the envelope prior to note off
- Release: The length of time the envelope takes to reach its zero point after note off. Press again to set the curve.

Where are the rest?

As mentioned earlier, this chapter only covers the envelope-related parameters assigned to a button in the Oscillator Group Edit section. To access Speed mode, BPM sync, ENV loops, and trigger sources, etc., press Osc 1-8 in the Individual Oscillator Settings section and navigate to the desired page. For a description of all Oscillator Envelope settings, see *Oscillator settings (p. 37)*.

QUICK TRICKS

The Oscillator Group Edit buttons offer some convenient features:

Copy and Paste

It's very easy to copy the parameter values from one oscillator to another in the Oscillator Group Edit section. For this example we'll copy the Attack Curve setting from one oscillator to the other seven.

1. Press [INIT] twice to start from an initialized patch.
2. Press [ATTACK] in the Oscillator Group Edit section. *The first press selects Attack time.*
3. Use Control knob 1 to set Osc 1 to a value higher than 100 ms so you can see the curve in the display.
4. Press [ATTACK] again to select page 2. *The second press selects Attack Curve.*
5. Turn Control knob 1 counter-clockwise to set an Exponential value of -24 or so.
6. Hold the [SAVE] button until after step 8. *All soft buttons are now lit in a cyan color.*
7. Press soft button 1 to select Osc 1 Attack Curve. *It turns black and soft buttons 2-8 are lit in a magenta color. They are valid targets for the copied data.*
8. Still holding [SAVE], press soft buttons 2-8 one after the other. *As each is pressed, it turns black and the value from Osc 1 is copied to that oscillator.*
9. When you're done, all 8 oscillators now have the same Attack Curve value. *Now you can adjust each one to make them slightly different, if you like.*

Note the second comment in step 7: "They are valid targets for the copied data." It is possible for an oscillator not to be a valid target during a copy/paste operation. For example, if you're trying to paste the Pitch of an Osc that is set to Semitones onto an Osc that is set to Frequency, this will fail. You'll see an error message when you try.

Let's try another example where this is the case.

1. Press [INIT] twice to start from an initialized patch.
2. Press [PITCH] twice in the Oscillator Group Edit section. *The first press selects the Pitch value; the second press selects the Pitch mode*.
3. Leave Osc 1 set to Semitone, and change Osc 2 and 3 to Ratio and Frequency, respectively.
4. Press [PITCH] again to return to the Pitch value.
5. Hold the [SAVE] button until after step 9.
6. Press soft button 1 to select the Osc 1 Pitch value as the copy source. *Note: Destinations that aren't available are grey, not magenta*.
7. Press soft button 2 to paste the value to Osc 2. *You'll see an error message that says "Inconsistent Pitch status, copy failed!"*
8. Still holding [SAVE], after the error message clears, press soft button 3 to paste the value to Osc 3. *You'll see the same error message*.
9. As long as you continue to hold [SAVE], you can paste the parameter value to any oscillator with a compatible setting.

Init + Random

- Hold [INIT] and press soft buttons 1-8 one at a time to reset the value of that parameter for the desired oscillators.
- It's the same with randomization: Hold [RANDOM] and press soft buttons 1-8 one at a time to randomize some or all parameters on that page. Remember that the amount of randomization is determined by the percentages set ahead of time, as described here in *Percent of Randomization (p. 23)*.

Envelope segments

As mentioned elsewhere, when you've selected one of the time-based Envelope segments there's a way to set the value that's even quicker than using a Control knob. For example:

- Select the Attack group
- Hold [SHIFT]
- Press and hold soft button 1, which controls OSC 1 Attack.
- After 2 seconds, release both buttons. You just set the attack time for Oscillator 1 to 2 seconds! This works when an Osc Envelope is set to BPM = On, too. The result depends on the tempo setting of the current patch in that case.

This works for all time-based Envelope parameters in the Group Edit section, as well as on the Individual Oscillator pages. Naturally it doesn't work on the Sustain parameter, which is a level (not a duration).

Wave groups

- [SHIFT] + Control knob jumps to the first wave in each wave group

Pitch / Fine

- [SHIFT] + Control knob jumps by octaves when Pitch mode = Semitone
- [SHIFT] + Control knob allows greater control when Pitch mode = Ratio or Frequency
- [SHIFT] + Control knob gives even finer control of Fine Tune when Pitch mode = Ratio.

All others (Feedback, Level, Envelopes):

- [SHIFT] + Control knob lets you fine-tune the parameter value.

O-scope view

The largest Oscilloscope view is available inside the top row of modules. You may want to visit the Level page when playing a note, for example, if you need to see a larger representation of the waveform output.

OSC ENV LEVEL & BIAS CONTROLS

There are four endless encoders in the OSC ENV LEVEL & BIAS section of the top panel. These encoders let you make relative adjustments to the Env Level, Attack, Decay, and Release of all 8 oscillators at the same time. They have range of -128.0 to +128.0.

These encoders are unusual, in that they are touch-sensitive (aka "capacitive") encoders; touch one with your fingers and you can view the current values of that parameter without having to edit them first.

The Bias controls let you make global adjustments to the patch very quickly. Hold [SHIFT] while turning one of the encoders to change the values more slowly. The oscillators will retain their relative levels up to the point that the first oscillator reaches either the minimum or maximum value. Once the min or max value of one oscillator has been reached, the others continue to change until they are all at the minimum or maximum level. If the Bias amount is returned to 0, the parameter returns to the original values for all oscillators.

ENV LEVEL BIAS

Let's try an example using the ENV LEVEL encoder. But first let's be sure we know which parameter we're talking about.

1. Press [INIT] twice to start from an initialized patch.
2. Select [OSC 1] and look at the lower left corner of the display. Edit fields 5 and 6 have Initial Level and ENV Level, respectively.
3. Adjust the ENV Level parameter to 65.0 for this example.
4. Lightly touch the top of the ENV LEVEL encoder in the OSC ENV LEVEL & BIAS section of the top panel. Edit field 1 shows OSC 1 ENV Lvl and a value of 65.0 in two places.
5. Hold [SHIFT] and turn the ENV LEVEL encoder until the center of the display shows a LEVEL BIAS value of +10.0. Edit field 1 shows OSC 1 ENV Lvl and the original value of 65.0 in the upper row, and the edited value of 75.0 in the second row.
6. At this point you can press any module button and the right side of the display shows the word BIASED above the VU meters. This lets you know that one of the OSC ENV LEVEL & BIAS encoders has been used to alter some of the values.
7. To reset the ENV LEVEL bias amount, hold [INIT] and touch that encoder. This resets the Bias amount to 0, and the original ENV Level value for Osc 1 has been restored to 65.0.

The table below shows the original levels, the levels if you add a value of 22.0, the levels with an added value of 63.0, and the levels if you turn the knob counter-clockwise to -128.0.

Original value	Bias +22.0	Bias +63.0	Bias -128.0
65.0	87.0	128.0 (exactly)	-63.0
100.0	122.0	128.0 (over)	-28.0
-20.0	2.0	43.0	-128.0 (under)
30.0	52.0	93.0	-98.0
105.0	127.0	128.0 (over)	-23.0
75.0	99.0	128.0 (over)	-53.0
95.0	117.0	128.0 (over)	-33.0
-63.0	-41.0	0.0	-128.0 (under)

Note: As you view the Bias display, read the outer cells for the original values and the inner cells for the biased values. It might take a while to become accustomed to that, because it means:

- On the top row the higher cell shows the original value and the second row shows the biased value
- On the bottom row the higher cell shows the biased value and the second row shows the original value.

Here's how the "Bias +63.0" example looks in the display:

As you can see above, if the biased outcome of a particular oscillator exceeds the maximum potential value (128.0), a horizontal line will appear on top of the Bias value (128.0).

In a similar way, if the biased outcome of a particular oscillator tries to go below the minimum potential value (-128.0), a horizontal line will appear at the bottom of the Bias value (-128.0). See the screen shot.

ATTACK TIME BIAS

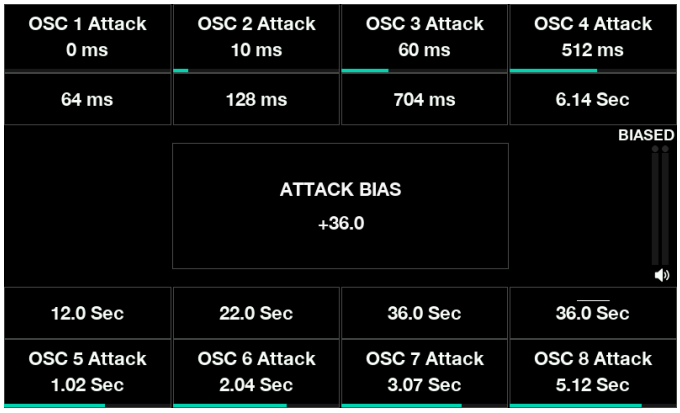
The behavior is nearly identical for each of the time-based Bias controls (Attack, Decay, and Release). We'll use the Attack Bias controller for these examples, but the results would be similar for the Decay and Release controls. (The difference: Maximum attack time is 36.0 seconds, but maximum decay / release times are 60.0 seconds.)

Unlike the ENV Level Bias, the Attack Bias is not a direct addition of values. This is because the total Bias range of +/- 128.0 needs to cover a much wider range of values. For example, this allows an attack time of 0 ms to reach the maximum time of 36.0 seconds with a Bias level of +128.0, and conversely, an attack time of 36.0 seconds can be reduced to 0 ms with a Bias level of -128.0.

Positive bias

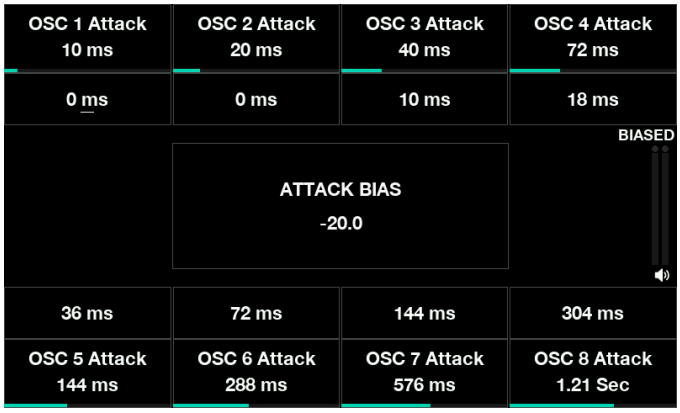
In the example screen shot below, an Attack Bias of +10.0 increases Osc1 attack time from 0 ms to 10 ms, and it doubles all of the other attack times: 10 ms becomes 20 ms, 512 ms becomes 1.02 seconds, 2.04 seconds becomes 4.09 seconds (the closest value available), etc.

In the example screen shot below, an Attack Bias of +36.0 increases Osc 1 attack time from 0 ms to 64 ms, Osc 5 attack time from 1.02 seconds to 12.0 seconds, and Osc 7 attack time from 3.07 seconds to the maximum of 36.0 seconds. The attack time for Osc 8 also increases from 5.12 seconds to 36.0 seconds, but it adds a line above the number because it can't exceed 36.0 seconds.



Negative bias

In the example screen shot below, an Attack Bias of -20.0 decreases Osc 3 attack from 40 ms to 10 ms, Osc 7 attack from 576 ms to 144 ms, and Osc 8 attack from 1.21 seconds to 304 ms. The attack times for oscillators 1 and 2 are both reduced to the minimum of 0.0 ms, but Osc 1 has a line below the number because it can't go any lower than 0.0 seconds.



SAVING A BIASED PATCH

After using the Bias controls you might want to save the results as a new patch. When you press [SAVE] you'll see that Edit field 8 is labeled Bias. The options for this parameter are Ignore and Convert.

- **Ignore** saves the patch but does not include the changes made with the Bias controls. This is good if the Bias controls were used for a live performance, for example, and you want to start over again with the Bias levels at zero while changing other desirable edits to the filters, etc.
- **Convert** saves the patch with the changes made with the Bias controls. The biased values become the new values for the patch, and you can use them as a starting point the next time the patch is selected.

ALGORITHMS — THE FRAMEWORK

The first affordable digital synth from the '80s had only 32 algorithms, and its 6 oscillators could only generate sine waves. In contrast, Leviasynth has over 140 preset algorithms, 8 oscillators per voice, and several hundred waveforms. You can even create your own algorithms!

On top of that, Leviasynth has 7 synthesis methods that can be applied independently to each oscillator, instead of only one: Phase Modulation, Frequency Modulation, Pulse Width Modulation, HTE Sync, and three forms of Phase Distortion. It boggles the mind to think about the capabilities of the synthesizer you hold in your hands.

We covered the oscillators in the previous three chapters. Now we'll explore some more of the ways you can use them together.

WHAT'S AN ALGORITHM?

Algorithms define the way the Leviasynth oscillators relate to each other. They also determine which oscillators are heard directly at the audio outputs (the carriers) and which are heard only through the effect they have on the carriers (the modulators). With thousands of potential algorithms possible, Leviasynth offers almost 150 preset algorithms and even lets you make your own.

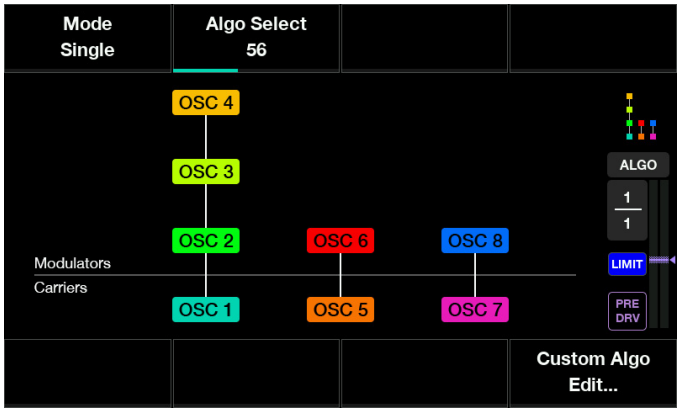
Keep in mind, though: Any oscillator can be a carrier, a modulator, or both at once. Leviasynth's flexible algorithm architecture and multiple synthesis methods open up a nearly infinite realm of sonic possibilities.

As a general rule, in most preset algorithms a carrier is altered by one or more modulators. But modulators can also affect other modulators, creating complex layered relationships before ultimately reaching a carrier that outputs to audio.

WHAT'S ALGORITHMIC SYNTHESIS?

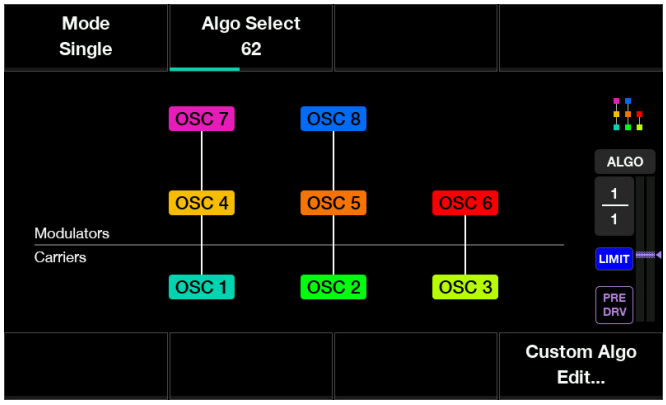
It can be daunting to anticipate all the ways oscillators interact in a complex algorithm like #100, where changing the level of one oscillator can affect 3 or 4 others at the same time. So it might be easier to grasp Algorithmic synthesis at first if you think in terms of using it to build up layers of smaller sounds, which you can then combine to create one bigger sound.

Look at preset Algorithm 56, for example. You could use oscillators 1-4 to build a mixed-mode sound using PD Saw and PW Mod, and use oscillators 5-8 to build a detuned "2-oscillator" sound, all inside the same patch. Each of these "patches within a patch" would be layered together to create one very lush, very musical patch.



Tip: In *Custom Algo Mode (p. 61)* you can solo a specific carrier oscillator so you can hear how it and its modulators contribute to the overall sound.

Here's another example of the multi-layered sound design approach: Preset Algorithm 62 (pictured below) has three parallel stacks of oscillators. If you think of each stack as a single oscillator, now it's more like the familiar structure of one of the early portable analog synthesizers, which had 3 oscillators. Make a cool wave with the first stack, copy those settings to the oscillators in the second stack and detune them, then add a sub oscillator with the third stack.



Of course, that beloved "early portable analog synthesizer with 3 oscillators" could only play one note. Leviasynth can play up to 16 notes at once!

THE ALGORITHM SECTION

The Algorithm section has a small display, one knob, and one button. It looks simple enough, but as we dive deeper you'll be amazed at the power this section contains.

Algorithm Display

As you turn the knob to select the preset algorithms, the display indicates the current selection.

- For algorithm numbers 01-99, the display shows that number.
- For algorithms 100 and up, a dot appears in the lower right corner of the display. You'll see 00.-44. for algorithms 100-144.

Hold [SHIFT] while turning the encoder to scroll faster through the algorithms.

Note: If you select a patch and the display shows a large "C", that means the sound designer made a custom algorithm for that patch. The "C" also appears if you select a preset algorithm, enter the Custom Algo Edit page, and change an oscillator connection.

For a printable list of the preset algorithms, visit *https://www.ashunsoundmachines.com/downloads*.

Algorithm Encoder

The knob in the Algorithm section is an endless encoder, which means it changes the value starting with the current value, regardless of its physical position. It is most often used to select algorithms on the Home page and inside Algo Edit. But there is one notable exception: When the Algo mode is set to Morph, the Algorithm knob is used to crossfade between adjacent algorithms.

Algo Edit button

This button is the portal through which the Algorithm modes are accessed. Push the button and read on!

ALGO EDIT: EXPLORE THE MODES

When you press [ALGO EDIT] you gain access to three distinct algorithm modes:

- **Single mode** provides an expanded view of the preset algorithms, and they can be selected here too.
- **Morph mode** lets you select up to 8 algorithms and crossfade between them.
- **Custom mode** lets you make your own algorithms, or modify an existing one that's close.

The [ALGO EDIT] button also serves as a quick modulation route creator: Hold any modulation source button, e.g. [ENV 4] or [LFO 5], then press [ALGO EDIT] to create a new modulation route. (Yes, you can select Algorithms with any mod source if Algo Mode = Single, and you can morph between algorithms with any mod source if Algo Mode = Morph. Suddenly your mod routes have gained a superpower!)

Algo Mode: Single

At first glance, the Algo Edit mode "Single" seems redundant: You can select any of the preset algorithms from anywhere. The knob and display do the same things here that they do when you're on any other page.

But what makes this mode special is that it provides a colorful graphic that illustrates the relationships between the oscillators in the preset algorithms. This graphic is as helpful to advanced users as it is to people just starting to learn about Algorithmic synthesis. It's like an aerial map of a city; it helps you understand how the landmarks are connected to one another.

Hold [SHIFT] while turning the encoder to scroll more quickly through the preset algorithms.

Tip: If you want an alternate view of a preset algorithm, press the Custom Algo Edit button inside the Algo Edit page to view the algorithm connections in a matrix format. As long as you don't change any connections, you can press EXIT and return to the original algorithm view. This can be a useful way to learn more about how Algorithmic synthesis works.

Algo Mode: Morph

Morphing between algorithms creates hybrid structures by blending characteristics of different algorithms, even algorithms with very little in common. It's an easy way to create unique relationships between the oscillators.

When the Algorithm Mode = Morph you can select up to 8 preset algorithms, place them in a row, and crossfade between them with incredible precision. Here are the key features of this Algorithm Mode:

- The **Algorithm display** shows the morph

position, with numbers between 1.0 and 8.0 representing morph values 1.00 - 8.00. Note the extra decimal point: There are 100 steps between 1.0 and 2.0, between 2.0 and 3.0, etc. This provides high-resolution morphing between the selected algorithms.

- You can use the **Algorithm encoder** to morph between the algorithms from any page. You can also set up a mod route and let an LFO, Envelope, or Macro do the morphing for you.
- Hold [SHIFT] while turning the Algorithm encoder for precise control.
- When you're inside Algo Edit, you can view the exact morph value in edit field 5 with a resolution of 1/100 of a value. The value can be changed with Control knob 5 or with the Algorithm encoder, and you can use [SHIFT] with either control.

By the way, you don't have to shift between the algorithms constantly with a modulator. You can find a sweet spot between two algorithms and save the patch like that.

The odds that you'll end up with the same set of morphed algorithms as anyone else are virtually zero. So let's try it!

ALGO LIST EDIT PAGE

Let's start from the beginning. If you're not already there, press the [SINGLE] button under the Master volume knob. Then:

1. Press [INIT] twice.
2. Press [ALGO EDIT] to enter that page.
3. Use Control knob 1 to change Mode to Morph.
4. Press Soft button 2 to enter the Algo List Edit page.

This lower-level page lets you pick an algorithm for each of the 8 Algo locations, or slots. These are labeled Algo 1, Algo 2, etc., as in "the first algorithm choice", "the second algorithm choice", etc. Options for each slot include OFF, Silence, and any one of the 140+ algorithms. Note: Algo 1 can't be set to OFF or Silence. One algorithm is always active.

The 8 Algo slots correspond to the x.0 positions of the Algo Morph value in the Algo display: Algo 1 = position 1.0, Algo 2 =position 2.0, etc. An Algo Morph value of 1.5, for example, is derived by morphing halfway between Algo 1 and Algo 2. The values have an extra decimal of resolution inside the Algo Edit menu in edit field 5: 1.0 = 1.00, 1.5 = 1.50, etc.

Two additional features make algorithm selection and auditioning very easy:

- Press the corresponding Control button or thumbnail to solo that algorithm. A speaker icon will appear under the white outline.
  - The Solo button breathes gradually at 30 BPM to indicate solo status.
  - Press another algorithm's Soft button to switch to solo a different algorithm.
  - To deactivate solo mode, press the lit Soft button or thumbnail again or change to another page.
- Hold [SHIFT] and turn a Control knob to change that algorithm and all that follow it. For example,
  - Hold [SHIFT] and turn Control knob 3.
  - As Algo 3 selects algorithm X, Algo 4 selects algorithm X+1, Algo 5 selects algorithm X+2, etc.

When an Algo is set to OFF, any Algo after it is treated as if it were located in an earlier position. For example, if Algo 7 = OFF but Algo 8 = #115, Leviasynth handles algorithm 115 as if it were Algo 7.

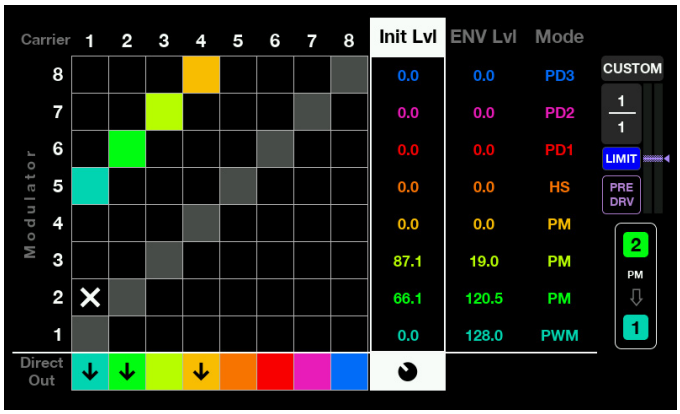
Custom Algo Mode

You may have already noticed Custom mode: If you selected a patch and saw a large "C" in the Algorithm display instead of a number, or you saw the words CUSTOM ALGO on every page instead of a thumbnail algorithm, that means the patch was created using a custom algorithm.

This is done using the Custom Algo Mode. It lets you create and edit custom algorithms using an intuitive grid-based interface, or matrix. You can use it to modify existing algorithms or build completely new ones.

UNDER THE HOOD

Press [ALGO EDIT] and then use Soft button 8 to enter the Custom Algo Edit page. Here's what you might see:



No other screen shows you more information at the same time. On this page you can view and change the relative levels of the Init Level, ENV Level, and Mode for each oscillator, and/or toggle various connections between oscillators on and off.

Tip: Even if you don't want to create a new algorithm, you can use Custom mode to provide a different view of the algorithm connections. As long as you don't change any connections, you can press EXIT and return to the original algorithm view. Leviasynth will keep the Algo Mode set to Single, rather than Custom, and the Algorithm display will show the number of the current preset algorithm rather than changing the display to a C.

MAKING A CUSTOM ALGORITHM

There are lots of ways to use Custom mode. For example, you can...

- make quick edits to a preset algorithm
- try different synthesis types in different combinations
- isolate components of the patch and see what they contribute to the sound

Here's how powerful the custom algorithm feature can be: For the preset algorithms, none of the oscillators can modulate Osc 8. But in a custom algorithm, they're all fair game; you can configure any oscillator to modulate any other, while also enabling the Direct Out for oscillators 2-8. The possibilities are endless!

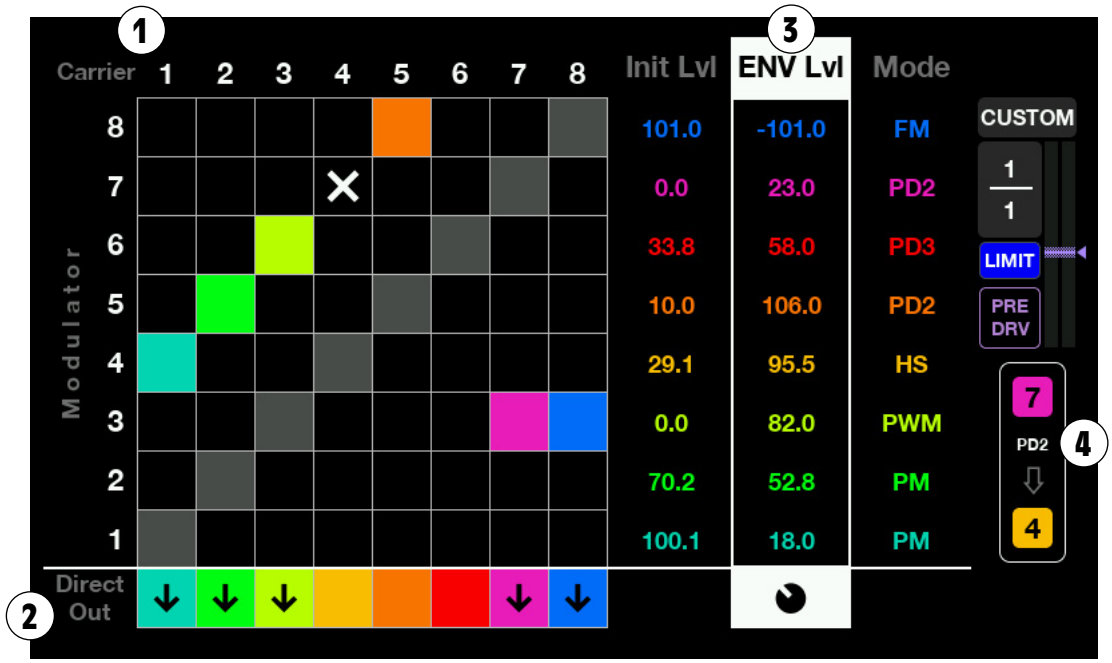
A couple of notes before we dive in:

- Custom mode keeps the current algorithm structure when switching from Single mode. It ignores the algorithms from Morph mode.
- After changing an oscillator connection in Custom mode, the letter C appears in the Algorithm display. If you press [EXIT] and try to change the mode to Morph or Single, you'll see an alert message that asks you if you want to give up the changes you've made. Press Yes if you're sure; if not, press No and your custom algorithm is preserved.

The Matrix: First Look

The Custom mode interface has four main sections:

1	The Oscillator Grid
2	The Direct Out row
3	Encoder Parameter groups
4	The Cursor Info section



The Oscillator grid

This is an 8×8 grid of on-screen buttons that toggle the modulation connections between the oscillators. Each square represents a connection point, which can be traced by its modulator row and carrier column:

- **Black squares** - available connections. Tap to connect oscillators.
- **Grey squares** - impossible connections (oscillators cannot modulate themselves)
- **Colored squares** - active connections. The color always matches the carrier oscillator (i.e., the Direct Out colors)
- **Cursor (X)** - shows the currently selected connection. This is also visible in the Info section by the VU meters.
- **White cursor** - connection is off
- **Black cursor** - connection is on

Each press on a button toggles the connection status.

The Direct Out row

A row of 8 buttons below the grid controls which oscillators output directly to audio. For oscillators 2-8, pressing repeatedly toggles between two states:

1. **Empty** - No direct audio output (modulator only, or unused)
2. **Down arrow** - Direct audio output present (may or may not be a carrier)

For Oscillator 1, the Empty option is not available since it always outputs audio, ensuring at least one oscillator output.

SOLO AN OSCILLATOR

You can solo an oscillator in the Custom Algo Edit grid by holding [SHIFT] and pressing its button in the Direct Out row. Its square will display a speaker icon.

When Solo is active, all relevant modulation mapping buttons in the Oscillator Grid remain colored while irrelevant ones turn light grey. The other 7 Direct Out buttons also turn light grey, which helps you see which oscillators contribute to the soloed sound.

Only one oscillator can be soloed at a time. To solo another oscillator, hold [SHIFT] and select its button in the Direct Out row. To exit Solo mode press the oscillator button again, or tap any other oscillator button in the Direct Out row.

MUTING VS. DISABLING

Muting an oscillator inside one of the Osc X modules doesn't change the algorithm; the connections remain intact. But disabling a Direct Out actually changes the algorithm structure by removing that oscillator from the audio output. Even if no other changes are made, the Algo Edit Mode changes from Single to Custom in this case.

Encoder Parameter Groups

Three parameter groups are available for the 8 Control knobs to edit. The values for OSC 1-8 are listed from bottom to top in each column. The encoder LED rings always reflect the values in the selected parameter group.

The parameter groups are shown in three columns. Tap the middle of one of the columns to select that parameter group. Here's how to interpret this section:

- **White rectangle indicator** - shows which group is selected.
- **Knob icon** - visible at the bottom of the selected group. It moves with the selection.
- **Real-time updates** - parameter values change in the display and around the encoder LED rings simultaneously.

Init Lvl - sets the starting level of each oscillator. Use Control knobs 1-8 to adjust values for Oscillators 1-8 respectively.

ENV Lvl - determines how much each oscillator's dedicated envelope can add to its level. Use Control knobs 1-8 to adjust values for Oscillators 1-8 respectively. Remember: ENV Level values are bipolar, so they can be set to negative or positive values.

Mode - selects the modulation type each oscillator uses when connected as a modulator. Use Control knobs 1-8 to select the modes for Oscillators 1-8 respectively.

- PM (Phase Mod)
- FM (Freq Mod)
- PWM (PW Mod)
- HS (HTE Sync)
- PD1 (Phase Distortion 1, or PD Square)
- PD2 (Phase Distortion 2, or PD Saw)
- PD3 (Phase Distortion 3, or PD Saw Pulse)

Remember: The mode setting determines how a modulator affects a carrier or another modulator. It does not affect the oscillator itself.

See *Oscillator Modes (p. 45)* in chapter 5 for a description of each mode.

The Cursor Info section

Located on the lower right side of the Custom Algo Edit window, this small section packs a lot of information about the cursor location:

1. The oscillator number of the modulator (top)
2. The oscillator mode of the modulator (using the abbreviations listed above)
3. A downward arrow to indicate the modulation path
4. The oscillator number of the carrier (bottom)

Can I reuse my new Algorithm?

A custom algorithm is stored with the patch in which you created it. If you want to re-use your new algorithm in another patch, start by making the patch with that algorithm into your custom INIT patch. To learn how to do this, see *System Services (p. 159)*.

THE FILTERS AND THEIR CONTROLS

Filters are second only to oscillators in defining the sound of a patch. Think of them as windows or doors: they can open as quickly and as far you like, or they can be narrow slits that only let through exactly as much of the sound as you want.

Leviasynth has two filters, one analog and one digital, with four dedicated top-panel knobs apiece. Each filter has its own character, and together they define the unique sonic profile of Leviasynth.

DIGITAL FILTER

The Digital Filter emulates the most legendary filter types from synthesizer history, and combines them into one cohesive sound-shaping tool. It has 18 different filter models, including...

- a 2-pole state-variable filter with two modes
- three high pass filters
- two band pass filters
- ten low pass filters, and
- our classic vowel filter.

Each of these filter models provides a powerful, perfect complement to the Analog filter.

The filters have been organized into groups of similar types; i.e., you'll find the high pass filters together, the low pass filters together, etc. You'll find that the Digital Filter delivers sonic possibilities that span decades of synthesizer evolution—all with the clarity and consistency that only digital processing can provide.

Press [DIGITAL FILTER] to access the following parameters.

Digital filter: page 1

Control	Parameter	Group	Range	Description
1	Type	SEM	LP-BP-HP, LP-NO-HP	State-variable filter: Low Pass / Band Pass / High Pass, or Low Pass / Notch / High Pass
		High Pass	HP MS20, HP 3-Ler, HP Stn12	High-frequency emphasis filters with distinct characters
		Band Pass	BP 3-Ler, BP Stn12	Mid-frequency isolation filters
		Low Pass	LP Ldr12, LP Ldr24, LP Fat12, LP Fat24, LP Gate, LP MS20, LP 3-Ler, LP Stn12, LP 1Pole, LP 8Pole	Classic low-pass designs from gentle to aggressive
		Vowel	Vowel	Vocal formant filter for human-like timbres
2	Morph Drive	—	0.0-128.0	Morph (SEM & Vowel types): continuous morphing control Drive (all other types): harmonic saturation amount
3	Cutoff	—	0.0-128.0	Cutoff frequency for most types; formant control for Vowel type
4	Resonance	—	0.0-128.0	Controls resonance or Q factor
5	ENV 1 Amt	—	+/- 64.0	Sets amount & polarity of Env 1 effect on Digital filter
6	Velocity > Env	—	+/- 64.0	Allows velocity to set maximum range of filter envelope
7	PolyAT	—	+/- 64.0	Sets amount of PolyAT control of filter cutoff, positive or negative
8	Keytrack	—	-200% to +200%	Scales filter response across the note range; C2 = center note

UNDERSTANDING THE DIGITAL FILTER TYPES

The 18 Digital Filter models fall into five distinct groups, each carefully chosen and optimized for different musical applications.

SEM (State-Variable Filters) The SEM filters are continuously morphing designs that can sweep smoothly between different filter modes. These

are perfect for creating evolving textures and dynamic filter sweeps that go beyond traditional cutoff movement.

- **LP-BP-HP**: State variable with band pass - morphs from Low Pass through Band Pass to High Pass
- **LP-NO-HP**: State variable with notch - morphs from Low Pass through Notch to High Pass

High Pass Filters When you need to emphasize the upper frequencies or remove low-end rumble, these three high-pass designs offer different flavors of brightness:

- **HP MS20**: Classic aggressive character with musical distortion at higher resonance settings
- **HP 3-Ler**: Boutique modular character with powerful resonance potential
- **HP Stn12**: 12dB per octave design with smooth, controllable response

Band Pass Filters For isolating mid-frequencies or creating vocal-like "wah" effects:

- **BP 3-Ler**: Boutique modular character with focused, clear band-pass response
- **BP Stn12**: 12dB design with dual 6dB slopes for musical, warm character

Low Pass Filters The heart of subtractive synthesis, these ten models cover everything from gentle warmth to aggressive character:

- **LP Ldr12**: 12dB uncompensated ladder filter—classic vintage thinning at high resonance
- **LP Ldr24**: 24dB uncompensated ladder filter—the full vintage experience with steep slope
- **LP Fat12**: 12dB compensated ladder filter—retains bass content at high resonance
- **LP Fat24**: 24dB compensated ladder filter—full-bodied sound with aggressive filtering
- **LP Gate**: Combines low-pass filtering with amplitude control for unique textures
- **LP MS20**: Classic character with distinctive musical distortion
- **LP 3-Ler**: Boutique modular character with powerful resonance potential
- **LP Stn12**: 12dB design with smooth, versatile response
- **LP 1Pole**: Gentle 6dB per octave for subtle warmth and character
- **LP 8Pole**: Steep 48dB per octave for dramatic cutoff effects

VOWEL FILTER

- **Vowel**: Vocal formant filter that transforms patches into textures with a human quality

Tip: Use [SHIFT] + scroll to jump quickly between filter type groups when browsing for the perfect filter profile.

COMPENSATED VS. UNCOMPENSATED LADDER FILTERS

Understanding the difference between compensated and uncompensated filters will help you choose the right character for your sound:

Uncompensated filters (LP Ldr12, LP Ldr24): As resonance increases, the low frequency content diminishes. This creates the classic "thin" resonant sound that defined many vintage synthesizers. Perfect when you want that cutting, aggressive resonant character that cuts through a dense mix.

Compensated filters (LP Fat12, LP Fat24): The bass response remains consistent even as resonance increases. This maintains the fundamental weight of your sound while adding harmonic emphasis. Ideal when you need resonant character without losing low-end power.

DIGITAL FILTER MODES

The SEM filters provide two distinct approaches to morphing, each with different characteristics in the middle position:

- **LP-BP-HP (Band Pass)**: At the middle morph position (around 64), this mode emphasizes the middle frequencies in a range defined by the Resonance setting. Perfect for vocal-like "wah" effects and frequency isolation.
- **LP-NO-HP (Notch)**: At the middle position, this mode removes middle frequencies while leaving everything else untouched. Ideal for surgically removing problematic frequencies or creating dramatic sweeping effects.

The differences become more pronounced with higher resonance values. You'll also notice that the Band Pass and Notch modes affect the Low Pass and High Pass extremes differently as you sweep through the morph range.

MORPH

For SEM types, this parameter provides continuous morphing between filter modes. At 0, you have pure low-pass filtering. As you increase toward 64, you transition through increasingly band-pass or notch characteristics. At 128, you arrive at pure high-pass filtering. The real magic happens in those in-between positions where the filter exhibits hybrid characteristics that create sounds impossible with traditional filter designs.

For the Vowel filter, this parameter controls the formant characteristics, allowing you to shape the vocal character with precise control over the frequency peaks that give the human voice its distinct identity.

The Morph knob in the Digital Filter control section also controls this parameter.

DRIVE

Available for all High Pass, Band Pass, and Low Pass filter types, the Drive parameter adds controlled harmonic saturation to your sound. Unlike simple distortion, this drive interacts musically with the filtering process, creating everything from subtle warmth to aggressive character.

At low settings, Drive adds harmonic richness and presence. As you increase the value, you'll hear pleasing saturation that enhances the filter's character. At maximum settings, Drive can create dramatic tonal transformation while maintaining musical quality.

Tip: Try moderate drive with classic ladder filters for vintage warmth, or push the drive hard on the steeper filters for modern aggressive textures.

CUTOFF

This controls the fundamental filtering frequency for most Digital Filter types. As you sweep the cutoff, you're determining which frequencies pass through and which are attenuated or removed entirely.

For the Vowel filter, this parameter becomes vowel control, morphing between different vocal sounds and creating the characteristic formant movements that make the patch "speak".

The Cutoff knob in the Digital Filter control section also controls this parameter.

RESONANCE

This adjusts the resonance of the Digital filter, emphasizing frequencies around the cutoff point. At moderate settings, it adds harmonic interest and character. At higher settings it can create dramatic sweeping effects, and many filter types will self-oscillate to produce pure tones for percussive attacks or a playable instrument in its own right.

The Resonance knob in the Digital Filter control section also controls this parameter.

Each filter type has its own resonant character—experiment to find which ones provide the musical response you're looking for.

ENV 1 AMT

This parameter defines the amount and polarity of the effect Envelope 1 will have on the Digital filter. Positive values open the filter as the envelope rises; negative values close it, creating inverse effects where the envelope darkens the sound instead of brightening it.

The ENV 1 knob in the Digital Filter control section also controls this parameter.

Envelope 1 has a pre-wired connection to the Digital filter section, which saves a mod route. But a different envelope can be used to control the filter if you want; just create a new route via *The Mod Matrix (p. 125)*.

VELOCITY > ENV

This creates the crucial link between your playing dynamics and the filter's response. Notes played at maximum velocity allow Envelope 1 to have its full impact on the filter frequency, within the range set by the ENV 1 Amt parameter. Lighter touches reduce this effect proportionally.

Negative values create "reverse dynamics" where harder playing reduces the envelope effect while softer playing increases it. This can create fascinating textures where gentle touches open up bright, complex timbres while aggressive playing produces darker, more focused sounds.

POLY**AT**

Polytouch® gives your fingers control over each note's filter response. This means you can press harder on a single pad to open or close the filter for that voice, while leaving other held notes unaffected. This level of expressive control transforms the Digital Filter into a truly dynamic, performance-oriented tool.

Positive values open the filter with increased pressure; negative values close it. When two complementary patches are layered in Multi mode, this bidirectional control means you can create patches where aftertouch darkens some notes while brightening others.

KEYTRACK

This parameter creates the relationship between the notes you play and the filter's cutoff frequency, with C2 as the center point. At 100%, higher notes proportionally raise the cutoff frequency while lower notes lower it, maintaining consistent brightness across the note range.

The default setting of 0% means no frequency tracking—the filter responds the same regardless of which note you play. Positive values create the natural relationship where higher notes sound brighter, while negative values invert this for creative effects.

Tip: Hold [INIT] and tap Soft button 8 to cycle through the most useful settings: 100% (natural tracking), 0% (no tracking), and -100% (inverted tracking).

Digital filter: page 2

Control	Parameter	Range	Description
2	Drive Pos	Pre / Post	Drive placement in signal path: Pre = before filtering, Post = after filtering
5	Vowel Order [1]	8 orders	Changes formant order during frequency sweeps (visible only when Filter Type = Vowel)
7	LFO 1 Amt	+/- 64.0	Sets amount and polarity of LFO 1 effect on filter
8	D. Filt Level	0.0-128.0	Controls the output level of the Digital filter

[1] Vowel Order is only visible when the Digital Filter Type = Vowel.

DRIVE POS

The placement of the Drive effect significantly changes its character and interaction with the filtering:

Pre (Default): Drive is applied before the filter, so the harmonic content created by the drive is then filtered. This can create smooth, warm overdrive effects where the filter shapes and tames the saturation, or you can use the filter to sculpt the harmonic content created by the drive.

Post: Drive is applied after the filter, preserving the filter's character while adding harmonic content to the filtered result. This often produces more aggressive, cutting tones and can add presence and bite to heavily filtered sounds.

VOWEL ORDER

When using the Vowel filter, this parameter selects from eight different arrangements of vocal formants:

AEIOU / AIUEO / AUIOE / AOUIE / IOUAE / UEOAI / IOEAU / UIEAO

Each order creates different relationships between the Cutoff and Morph parameters, allowing you to find the perfect vowel progression for your musical needs. Try different Vowel Orders with slowly changing modulation sources to create realistic vocal textures or otherworldly, humanoid effects.

LFO 1 AMT

This sets the depth and polarity of the effect LFO 1 can have on the Digital filter. Use this for classic filter sweeps, rhythmic pumping effects, or subtle textural movement.

LFO 1 has a pre-wired connection to the Digital filter, saving you a modulation matrix slot. You can still route any of the other four LFOs to create complex multi-layered filter modulation through the Mod Matrix.

Tip: Try slow triangle waves for lush evolving pads, or tempo-synced square waves for rhythmic gating effects that lock to your track.

D. FILT LEVEL

This controls the output level of the Digital filter as it feeds into the rest of the signal chain. At the default setting of 64.0 (representing 100%), the Digital filter operates at unity gain. You can boost this for more aggressive filtering effects or reduce it for subtle processing.

This parameter becomes especially important when using high drive settings or self-oscillating resonance, as it allows you to maintain consistent levels between your patches.

ANALOG FILTER

The Analog Filter brings the warmth, character, and subtle imperfections that only analog circuitry can provide. While the Digital Filter excels at precision, the Analog Filter adds an organic quality that cannot be achieved by any other method.

This isn't just about nostalgia—analog filtering behaves differently at a fundamental level. Component tolerances, temperature variations, and the natural nonlinearities of analog circuits create subtle variations that make sounds feel alive. The Analog Filter captures this essence while providing the stability and reliability of modern design.

The Analog Filter serves as the final stage in the audio path prior to the VCA. Whether used subtly to add character or pushed hard for aggressive saturation, it's your pathway to that coveted analog sound.

After Leviasynth powers up for the first time, give the analog filters 1/2 hour to warm up and then run the Calibrate VCF routine. This is located on the *Calibration (p. 159)* page.

Analog filter parameters

Press [ANALOG FILTER] and adjust these parameters as needed:

Control	Parameter	Range	Description
1	Pre-Drive	0.0-128.0	Analog saturation applied before filtering
2	LFO 2 Amt	+/- 64.0	Sets amount & polarity of LFO 2 effect on filter
3	Cutoff	0.0-128.0	Cutoff frequency for the Analog filter
4	Resonance	0.0-128.0	Controls resonance; self-oscillates around 110.0
5	ENV 2 Amt	+/- 64.0	Sets amount & polarity of Envelope 2 effect on filter
6	Velocity > Env	+/- 64.0	Allows velocity to set maximum range of filter envelope
7	PolyAT	+/- 64.0	Polyphonic aftertouch control of filter cutoff
8	Keytrack	-200% to +200%	Scales filter response across note range; C2 = center note

PRE-DRIVE

The Analog Filter's Pre-Drive adds authentic analog saturation before the filtering stage. The saturation characteristics change dynamically with the input signal, creating natural compression and harmonic enhancement.

The default setting of 16.0 provides a subtle foundation of analog warmth. As you increase the value, you'll hear pleasing saturation that enhances the filter's character. The drive is gain-compensated, so you maintain consistent levels while adding harmonic content.

The Pre-Drive knob in the Analog Filter control section also controls this parameter. As the value changes, a purple line moves inside the VU meters in the Info section. When the value is zero, the purple line disappears and the [PRE DRV] icon turns grey.

The drive circuit is carefully calibrated so that with a single oscillator input, you'll hear minimal yet noticeable drive effect at maximum settings. With all eight oscillators feeding the filter, the drive effect becomes much more pronounced, allowing the filter to handle everything from single-voice leads to complex polyphonic textures.

LFO 2 AMT

This parameter defines the amount and polarity of the effect LFO 2 will have on the Analog filter.

LFO 2 has a pre-wired connection to the Analog filter, which saves a mod route. But a different LFO can be used to control the filter if you want; just set this value to 0 and create a new route via *The Mod Matrix (p. 125)*.

Tip: Try slow, subtle LFO movement for evolving pad textures, or sync LFO 2 to tempo for rhythmic filter pumping that locks to your DAW.

CUTOFF

This controls the cutoff frequency for the Analog filter. It's a 4-pole filter design, which means that frequencies above this point are reduced at a rate of 24 dB / octave.

The default setting of 128.0 provides a wide-open filter that allows all frequencies to pass through while still imparting subtle analog character.

The Cutoff knob in the Analog Filter control section also controls this parameter.

The analog cutoff responds naturally to drive and resonance settings, creating complex interactions that contribute to the organic feel of the filter.

RESONANCE

This adjusts the resonance of the Analog filter at the cutoff frequency. At moderate settings, it adds harmonic emphasis and character. As you push it higher, the filter develops the kind of musical self-oscillation that made analog filters legendary.

Around a value of 110.0 the filter begins to self-oscillate, producing pure tones that can be used for sound design or musical effect.

The Resonance knob in the Analog Filter control section also controls this parameter.

Tip: The Analog Filter's resonance interacts beautifully with the Pre-Drive setting. Try moderate drive with high resonance for singing, vocal-like tones that cut through a mix.

ENV 2 AMT

This parameter defines the amount and polarity of the effect Envelope 2 will have on the Analog filter. Use it to create dynamic filter sweeps that follow the amplitude envelope of the patch, or create independent filter movement for more complex patches.

The ENV 2 knob in the Analog Filter control section also controls this parameter.

Envelope 2 has a pre-wired connection to the Analog filter section, which saves a mod route. But a different envelope can be used to control the filter if you want; just create a new route via *The Mod Matrix (p. 125)*.

VELOCITY > ENV

This creates natural musical expression where your playing dynamics directly control the filter's response. Notes played at maximum velocity allow Envelope 2 to have its full impact on the filter frequency, within the range set by the ENV 2 Amt parameter.

With proper adjustment, gentle playing can produce warm, filtered tones while aggressive playing opens up the analog filter for bright, cutting sounds with full harmonic content.

Negative values create "reverse dynamics" where harder playing reduces the envelope effect while softer playing increases it—a technique that can create fascinating textures when combined with the analog filter's natural character.

POLY**AT**

The combination of analog filtering with our patented Polytouch® technology creates incredibly expressive possibilities. Each finger can control the amount of filter applied to its note, allowing the Analog Filter respond to every nuance of your performance.

Positive values open the filter with increased pressure; negative values close it.

KEYTRACK

This parameter scales the analog filter response across the note range, with C2 as the center note. The default setting of 100% creates natural tracking where higher notes sound brighter and lower notes sound darker, mimicking the behavior of acoustic instruments.

Tip: Hold [INIT] and tap Soft button 8 to cycle through the most useful settings: 100% (natural tracking), 0% (no tracking), and -100% (inverted tracking).

WORKING WITH BOTH FILTERS

The real magic of Leviasynth's filter section emerges when you use both filters creatively. The Digital Filter has 18 types, each with a distinct profile, while the Analog Filter adds its time-honored signature for the final flourish. Together, they create possibilities neither could achieve alone.

Notes about Signal Flow

The Digital Filter processes your sound first, then feeds into the Analog Filter. This allows for complex, two-stage filtering effects.

Creative Combinations

- Use the Digital Filter for aggressive initial shaping, then apply some gentle Analog filtering
- Set the Digital Filter to a vowel sound, then further shape the sound with the Analog filter with a specific resonant peak
- Create dramatic sweeps with the Digital Filter while the Analog Filter provides complementary sculpting
- Use high Digital Filter drive into moderate Analog Filter drive, or vice-versa, for complex harmonic saturation

Performance Strategies

- The dedicated filter control knobs let you play both filters simultaneously during performance
- Try opposite modulation on each filter—as one opens, the other closes, for unusual timbral shifts

Sound Design Applications

- Use the dedicated envelope sources (ENV 1 for Digital, ENV 2 for Analog) to create complex filter interactions
- Use one filter for rhythmic effects, while sweeping the cutoff frequency with the other filter
- Create modern textures with the Digital Filter, then shape them with the Analog filter for the best of both worlds

The combination of digital precision and analog warmth gives Leviasynth a unique voice in the world of synthesis. Take time to explore how these two very different filter approaches can complement each other in your patches.

Set up mod routes quickly from an Envelope or LFO to one of the Filters: Hold the module button for the desired source, then press the module button for the destination.

THE VCA MODULE

The output level of a Leviasynth patch can vary widely, depending on the number of active oscillators. For example, one voice using one oscillator is much quieter than 16 voices using all 8 oscillators. But once you have the balance between the oscillators just right, you need an easy way to maintain that balance while adjusting the signal into the next stage, and then into the next stage, etc. Thankfully, the VCA module lets you control the signal at 5 different places in the signal path.

The VCA module has one page, 8 parameters, and a visual depiction of the audio signal path. The signal flows from left to right, with meters to indicate the relative levels of the sound as it passes through each section. Dotted lines tell you which parameter controls the strength of the signal at each stage.

You may want to visit this page often while creating a patch, as it helps you see which part of the patch needs to be tamed or inflamed to optimize the signal output. This way you can minimize distortion or make the most of it, depending on what you want!

Control knob	Parameter	Range	Description
1	OSCs Level	0.0-128.0	Controls output of Osc 1-8 into the Digital Filter
2	D.Filt Level [1]	0.0-128.0	Adjusts output of Digital Filter into Analog Filter pre-drive
3	VCA Level	0.0-128.0	Controls pre-FX level of patch
4	Patch Level [2]	0.0-128.0	Governs the final output level of the patch
5	LFO 3 amount	+/- 64.0	Controls amount and polarity of LFO 3 amplitude modulation
6	Velocity > ENV	+/- 64.0	Adjusts Envelope 3 velocity response
7	PolyAT	+/- 64.0	Amount/direction of polyphonic aftertouch control of VCA
8	Initial Level [3]	0.0-128.0	Sets the starting output level of all voices. Results depend on oscillator settings

[1] A value of 64 for the Digital Filter output level =100%

[2] This parameter is labeled Part Level in Multi mode.

[3] Depending on the oscillator settings, as this value rises you may hear the last 16 triggered notes. See *Initial Level (p. 71)* for more information.

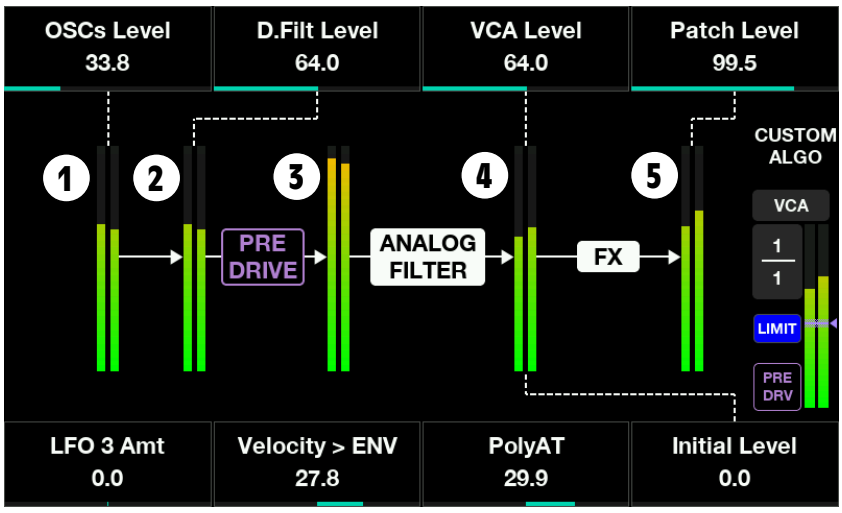
HOW TO READ THE VCA DISPLAY

You may have heard the phrase "proper gain staging" when working with an amplifier or a mixing console. It's an important concept: When there are multiple components in an audio path, find the right balance between each of the components to prevent signal degradation and to minimize the noise floor.

That's what the Leviasynth VCA module does: It lets you control the output of each component (i.e, its gain) at each stage of the signal path. Press [VCA] and let's take a look.

The vertical bars are level meters. Each one shows the level of the signal after the associated level controls, which are connected by dotted lines to their parameters in the soft buttons:

1	The combined output of all oscillators as it heads into the Digital Filter
2	The output of the Digital Filter being sent to the Analog filter's Pre-Drive stage
3	The output of the Pre-Drive stage as it is fed to the Analog filter
4	The output of all voices and stages being sent to the Effects
5	The combined output of everything the synth can do, heading for the outside world.



Note: The loudest triggered voice sets the level you see in the meters.

The white ANALOG FILTER and FX blocks are merely visual aids. But the PRE DRIVE block is more than that. Its status is always identical to what you see in the *Right side: the Info section (p. 24)*; when it is purple, the Analog Filter Pre-Drive parameter has a non-zero value; when it is greyed out, that value is 0.0.

WHAT THE PARAMETERS DO

As mentioned earlier, the VCA module taps into 5 places in the signal path so you can adjust the levels precisely where they need to be adjusted. We'll cover the parameters slightly out of order: The first 5 parameters listed below operate independently, and the last 3 operate within range set by the VCA Level parameter.

OSCs Level

This parameter controls the output of all 8 oscillators at once. It maintains the balance between the oscillators while adjusting the signal into the Digital Filter.

D. Filter Level

The D. Filter Level parameter controls the strength of the Digital Filter output as it heads into the Analog Filter Pre-Drive component.

A value of 64 for the Digital Filter output level =100%, or what is referred to as "unity gain." With values between 65 and 128, you might hear the Analog Filter Pre-Drive start to bring in a bit of analog distortion if its value is above 0. If you want the signal to be as pure as possible as it enters the Analog Filter, set the *Pre-Drive (p. 68)* to zero.

VCA Level

The VCA Level parameter sets the maximum output level for the signal before it heads into the Effects section. It can be used several ways:

- to determine how far ENV 3 is allowed to open the VCA
- to compensate for quieter or louder output from the oscillators and filters
- to prevent unwanted clipping in the Effects.

It also sets the operational range for the *LFO 3 Amount (p. 71)*, *Velocity > ENV (p. 72)*, and *PolyAT (p. 72)*.

Patch Level

The Patch Level parameter is the final arbiter of the output level of each patch. Use it to set the relative levels between adjacent patches in a bank, without affecting the overall quality of the sound. It won't reduce or increase distortion, the VCA Level, the FX mix, or anything else in the patch.

A value of 64 for the Patch Level =100%, or what is referred to as "unity gain." As mentioned above, values between 65 and 128 can be used to compensate for a quieter patch, if needed. But higher values may indicate the need to boost the gain earlier in the signal chain.

You may notice this parameter is labeled Part Level, not Patch Level, while editing the Upper / Lower patches inside a Multi. It operates within the values set by the Upper / Lower Level parameters in *Multi Edit mode (p. 132)*. For example, if Lower Level is -36.0 dB, the VCA Part Level has no audible effect on the Lower part.

If you're looking for the LFO 3 Amount, Velocity, and PolyAT parameters, you'll find them after the next section.

Initial Level

This feature is widely available in modular synthesizers, but it may seem strange if you're new to synthesizers. As a modulation destination, it allows any source to control the VCA through the Mod matrix, including the Mod 1 / Mod 2 inputs.

The VCA Initial Level is a global offset, not a per-voice control, so it affects all 16 voices at the same time. With a non-zero value, the VCA will pass the audio of any oscillators that are currently making sound.

This can be a surprise when the patch is first selected; you might hear audio from the last 16 triggered voices even if you haven't played any notes for a while. The signal would include any oscillators with non-zero Initial Level values, plus any oscillators passing through their envelope stages at that time.

The LFO 3 Amount, Velocity, and PolyAT parameters operate within the limits set by the VCA Level parameter.

LFO 3 Amount

This parameter adjusts the amount and polarity of the effect LFO 3 has on the Amplitude of the patch. It uses the current value of the VCA Level parameter as its starting point.

A negative value for LFO 3 Amount inverts the phase of the LFO waveform. For example, if the LFO 3 wave is set to Saw Up, it will behave like a Saw Down wave when the LFO 3 Amount is set to a negative value.

The VCA Level setting also sets the upper limit of the amplitude modulation. In other words, a bi-polar LFO waveform will not cause the amplitude of

the patch to rise higher than the VCA Level value. This helps prevent unwanted clipping of the signal as it heads into the Effects section.

Velocity > ENV

The Velocity parameter determines how much the amplitude stage will respond to note velocity. Negative values invert the response, so that an increase in velocity reduces the amplitude.

When Velocity is set to 0 there will be no velocity response at the amplitude stage. However, other parameters might still respond to velocity, depending on the settings in the Mod Matrix and elsewhere in the signal path.

As the Velocity value is increased the amplitude will decrease if a note is played at less than maximum velocity. What the Velocity parameter does is create "headroom" for the velocity-to-amplitude response.

In other words, the VCA Level parameter sets the upper limit for the velocity response. That way a note cannot push the amplitude of the patch higher than the VCA Level value. This helps prevent unwanted clipping of the signal as it heads into the Effects section.

PolyAT

Polytouch® gives your fingers control over each note's amplitude. This means you can press harder on a single pad to open or close the VCA for that voice, while leaving other held notes unaffected.

Positive values open the VCA with increased pressure; negative values close it.

WHAT'S AN ENVELOPE?

An envelope defines the shape of a modulation: how it begins, how it ends, and how big it will be in the middle. Leviasynth has 13 envelopes that can be used to shape any available parameter through the Mod Matrix. Five of the envelopes have dedicated top-panel buttons (ENV 1-5); the other 8 are tucked inside the Oscillator modules, and are found on *Oscillator settings: page 1 (p. 37)* and *Oscillator settings: page 2 (p. 40)*. In this chapter our focus is Envelopes 1-5. They have identical parameters, so every description applies equally to all.

Envelope features

ADSR PLUS

All Leviasynth envelopes provide the classic ADSR form factor (Attack, Decay, Sustain, and Release). But they've been enhanced with delay and hold stages, so technically the form factor is DAHDSR.

ADJUSTABLE CURVES

The Attack, Decay, and Release segments have curves that can be adjusted gradually from Logarithmic to Linear to Exponential. They can be snappy, lazy, or anything in-between. This allows you to specify exactly how you want the patch to proceed from start to finish.

SPEED MODE: FAST OR SLOW

Speaking of "snappy or lazy," each envelope has a Speed mode that changes all segments at once between the Fast and Slow settings. In Slow mode an envelope can be almost an hour long! And that's not counting loops (read on...).

Note: Changing the Speed mode only affects parameters with a duration, not the Sustain level, the curves, or the velocity settings.

TIME-BASED SEGMENTS

Envelopes can operate in one of two modes: synchronized or unsynchronized. If the BPM Sync option is On each segment can occupy a specific rhythmic value. If the BPM Sync option is Off the duration of each segment is measured in seconds (or milliseconds). Every envelope and segment will last exactly as long as you want.

Note that the BPM Sync setting affects all stages except Sustain, which is merely a level (i.e., a place, not an event).

MULTIPLE TRIGGER SOURCES

Leviasynth envelopes can be triggered by as many as four sources once a voice is active. Once it is triggered an envelope can run freely (Freerun: On), reset with each new note (Reset: On), or reset only if all other notes have been released (Legato: On).

It's easier to hear an envelope reset with a monophonic patch than with a polyphonic patch. For an example see the description of *Reset (p. 75)*.

LOOPING ENVELOPES

Leviasynth envelopes can loop a specific number of times or indefinitely. You can even select one of three loop ranges (Delay > Attack, etc.). These concepts are explained later in this chapter (*Envelope Loop (p. 76)* and *Stage Loop (p. 76)*).

MODULATION AND INTERACTION

An envelope can be used as a modulation source for any destination, and individual envelope segments can be modulated (shortened or lengthened) by LFOs or by other envelopes.

Thanks to the Mod Matrix, envelopes and LFOs can interact and evolve in a nearly infinite number of ways. For a quick tip on how to do this, see *Envelope Shortcuts (p. 77)* at the end of this chapter.

Envelopes 1, 2, and 3

Leviasynth has pre-wired connections linking ENV 1 to the Digital filter, ENV 2 to the Analog filter, and ENV 3 to the VCA module. This is because every sound has amplitude and timbre, even if a distinct pitch is not present. More envelopes can be routed to these destinations as needed through *The Mod Matrix (p. 125)*.

Envelope parameters: page 1

Control knob	Parameter	Range [1]	Description
1	Attack	Speed mode = Fast BPM = Off: 0 ms to 36.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 600 sec BPM = On: 0, 1/4 to 192'	After the delay period, the length of time the envelope takes to reach its full amplitude.

2	Decay	Speed mode = Fast BPM = Off: 0 ms to 60.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 900 sec BPM = On: 0, 1/4 to 192'	After the hold period, the length of time the envelope takes to reach its sustain level.
3	Sustain	0.0 to 128.0	The resting level of the envelope prior to note off
4	Release	Speed mode = Fast BPM = Off: 0 ms to 60.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 900 sec BPM = On: 0, 1/4 to 192'	The length of time the envelope takes to reach its zero point after note off
5	Delay	Speed mode = Fast BPM = Off: 0 ms to 32.0 sec BPM = On: 0, 1/64T to 64' Speed Mode = Slow BPM = Off: 0 ms to 60.0 sec BPM = On: 0, 1/4 to 192'	The length of time before the attack segment begins
6	Hold	Speed mode = Fast BPM = Off: 0 ms to 36.0 sec BPM = On: 0, 1/4 to 192' Speed Mode = Slow BPM = Off: 0 ms to 600 sec BPM = On: 0, 1/4 to 192'	The length of time between the attack and decay segments
7	Speed Mode	Fast, Slow	Toggles all segments between two speed ranges
8	BPM Sync	Off, On	Toggles all envelope segments from sec to synchronized time divisions.

[1] 64' = 16 bars, 192' = 48 bars.

To set the length of an envelope segment quickly: While on page 2, hold [SHIFT] and press the appropriate Control button for the desired length of time. This works with BPM On or Off and whether the Speed Mode is Fast or Slow.

BPM SYNC SETTINGS

When the BPM Sync parameter is set to On, all of the segments with durations are measured in rhythmic values. This includes the Delay, Attack, Hold, Decay, and Release stages of the envelope. A duration can be set to 0, which means it happens instantly and therefore has no rhythmic value.

All other settings have a quantized duration ranging from 1/64T (a sixty-fourth note triplet) to 64' (64 quarter notes, or 16 measures in 4/4 time). Dotted values are also available. The chart below contains examples of how the values are shown:

Value	Duration
1/16	Sixteenth note
1/16Dot	Dotted sixteenth note
1/16T	Sixteenth note triplet
1/1	Whole note, or 1 measure
8'	Eight quarter notes, or 2 measures
64'	Sixty-four quarter notes, or 16 measures
192'	One hundred ninety-two quarter notes, or 48 measures

Envelope parameters: page 2

Control knob	Parameter	Range	Description
1	Attack Curve	Exp (-64) > Lin (0) > Log (64)	Defines the curve for the attack segment.
2	Decay Curve	Log (-64) > Lin (0) > Exp (64)	Defines the curve for the decay segment.
3	Quantize	(various)	Reduces envelope resolution

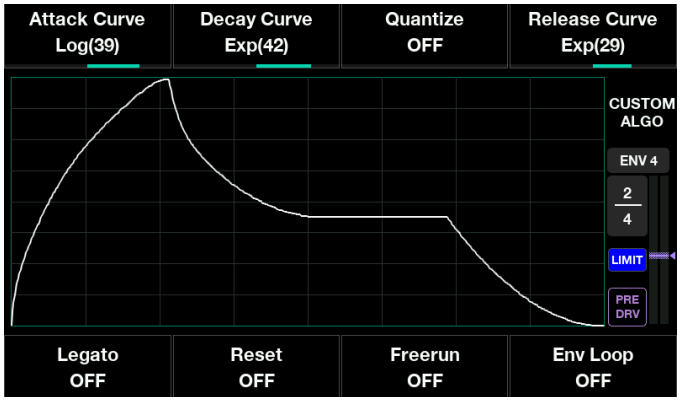
4	Release Curve	Log (-64) > Lin (0) > Exp (64)	Defines the curve for the release segment.
5	Legato	Off, On	When On, an envelope won't reset unless all notes have been released.
6	Reset	Off, On	When On, an envelope is reset when polyphony is exceeded. If Legato = On, Reset is not available.
7	Freerun	Off, On	When On, an envelope will always run from Delay to the Sustain stage (note held) or from Delay through the Release stage (note released).
8	Env Loop	Off, 2-50, Infinite	Toggles the looping feature and defines the number of times the envelope will loop.

ENVELOPE CURVES

Adjacent logarithmic curves look like a mound: The attack segment rises quickly and its rate of change slows as it nears the peak; the decay and release segments start falling slowly and accelerate until they reach the resting state.

Conversely, adjacent exponential curves resemble a spike. They're the opposite of logarithmic curves: The attack segment starts rising slowly and accelerates upward; the decay and release segments start falling quickly and decelerate until they reach the resting state.

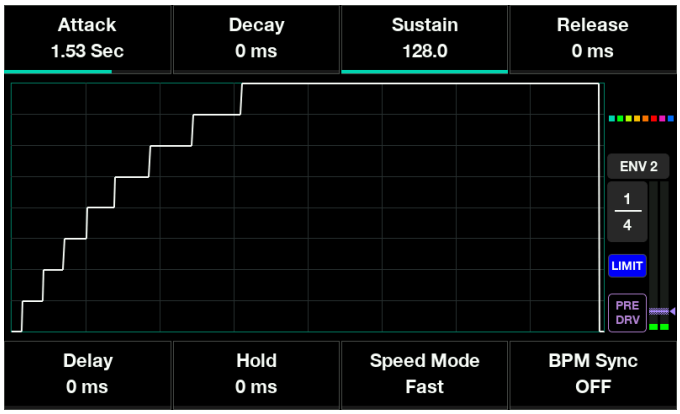
A linear curve rises and falls at the same rate throughout its duration. However, linear changes seem less natural or "musical" to the human ear than the other curves.



ENVELOPE QUANTIZE

The Quantize option can add a stepped effect to the Envelope output. For example, it can make a complex attack very easily.

1. Press [INIT] twice.
2. Press [OSC 1] and set Waveform to Saw.
3. Set the Analog Filter CUTOFF to minimum and the ENV 2 knob to maximum.
4. Press [ENV 2] and use Control knob 1 to set the Attack to 272 ms.
5. Press Octave Down and play pad 1. You'll hear a basic brass sound.
6. On Env 2 page 2, set Quantize to 9.
7. Play the same note and listen to its attack. It has a bit of "spit", like a real trombone.
8. On Env 2 page 1, set Attack to 1.53 seconds.
9. Hold the note and listen. The quantized attack is easier to hear.
10. Try different Quantize values. OFF is smooth; other values have steps.



LEGATO

When sheet music uses the term "Legato" it means to play a passage smoothly, with no rests between the notes. Likewise, when this parameter is set to On, the envelope will not retrigger if previous voice has not been released. This allows a filter envelope to remain at its sustain stage when a series of notes are played, for example, which can help a solo or a bass line to be more expressive.

RESET

The Reset parameter is only available when Legato is Off. When Reset is On an envelope will reset when a new note is played, even if the previous note has not been released.

The difference between Reset On and Off is easy to hear with a monophonic patch. But with a polyphonic patch the behavior is more obvious after the available polyphony has been exceeded. You'll need a sustain pedal for the following example.

1. Set speaker/headphone levels low; this could be loud.
2. Press [MULTI] to enter Multi mode.
3. Press [INIT] twice to initialize the Multi.
4. Turn the Balance knob to -64.0 (hard left). We'll hear the Lower part play voices 1-8 for this example.
5. Press [OSC 1] and change the Waveform to Saw.
6. Press [DIGITAL FILTER] and set Type to High Pass: HP MS20.
7. Set Cutoff to 32, Resonance to 100, and ENV 1 Amt to 64.
8. Access [ENV 1]: set Attack and Decay to ~1 second, and set Sustain to ~64.
9. Hold down the sustain pedal and watch the display.
10. Press Octave Down twice and play 7 notes on pad 1.
11. Wait for the filter to reach the sustain level for all 7 voices.
12. Play the 8th note and listen as the filter sweeps through all frequencies.
13. Wait until the filter stabilizes for voice 8, then play pad 1 again.
14. Watch the display and listen: The filter sweeps from the sustain level, not all frequencies. Notice how it starts halfway up the attack segment in the envelope graph, not the zero point.
15. Release the pedal.
16. Press the Page Down arrow and set Reset to On.
17. Repeat steps 9-15.
18. The difference: The filter starts at the zero point of the attack segment and sweeps through all frequencies for all notes, not just the first 8.

In summary, here's what to expect with a polyphonic patch:

- Reset = On: A retriggered voice starts the envelope from its beginning.
- Reset = Off: A retriggered voice starts the envelope from the sustain level.

FREERUN

An envelope set to Freerun passes through all segments, even if the note is released before the end of the decay segment. If the note is held then the envelope proceeds to the sustain level and remains there until the note is released, after which the envelope proceeds through the release segment.

ENVELOPE LOOP

This parameter lets you loop all or part of an envelope a specific number of times (between 2 and 50), and when set to Inf (Infinite) the loop can last forever. This means an envelope can even be used as a complex LFO (if 5 LFOs aren't enough!). The loop range is defined by the Stage Loop parameter (read on).

Envelope parameters: page 3

Control Knob	Parameter	Range
5	Velocity Curve	Exp (-64) > Lin (0) > Log (64)
6	Velocity > ENV	+/- 64.0
7	Stage Loop	Delay > Attack, Delay > Hold, Delay > Decay
8	Level	0.0-128.0

VELOCITY CURVE

This controls the shape of the Envelope's velocity response: exponential, linear, or logarithmic. It works within the range set by the Velocity > ENV parameter.

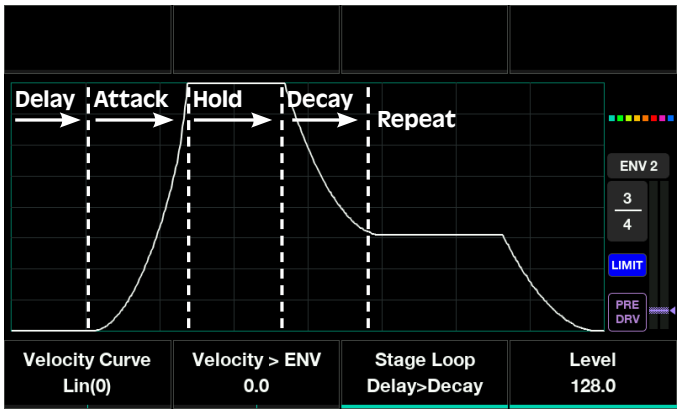
VELOCITY > ENV

This determines the amount and polarity of the Envelope's response to velocity.

STAGE LOOP

This lets you define which segments of an Envelope are included in the loop. The Delay and Hold segments are always included, but if Delay = 0 the loop effectively begins with the Attack segment. Likewise, if Hold = 0 the loop jumps immediately from the Attack segment to the Decay segment.

Note: This parameter won't do anything unless the Loop is enabled on *Envelope parameters: page 2 (p. 74)*.



LEVEL

To have a Level parameter for one of the hard-wired envelopes seems strange at first, because the filters each have an Envelope Amount

parameter (for example). But remember that each envelope also can be used as a modulation source in *The Mod Matrix (p. 125)* and/or chosen as the *ENV Source (p. 44)* for an oscillator. This parameter gives you the option to change the level of all of those assignments at one time, while retaining independent level control at each of the other destinations to compensate for those changes as needed.

Envelope parameters: page 4

The most basic way to trigger and gate an envelope is to press and release a pad. But once a voice is active, an envelope can be triggered by a variety of sources. And not just one source: Each envelope can have as many as four trigger sources.

Control	Parameter	Range
Knob 1	TrigSrc1	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Knob 2	TrigSrc2	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Knob 3	TrigSrc3	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Knob 4	TrigSrc4	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Button 5	Tap Trigger	Tap this button to trigger the envelope. The envelope does not sustain while the button is held.

ENVELOPE SHORTCUTS

These are described in greater detail in other chapters, but they're so easy and useful we've included them here too.

Copy Env A to Env B

1. Hold [SAVE]
2. Press and release the source (Envelope A)
3. Press and release the destination (Envelope B)
4. Release [SAVE].

Create a direct Mod route

To set up a mod route to a specific parameter from inside a module:

1. Hold [ENV X] to select the source
2. Press the Control button for the desired destination parameter, then release both buttons
3. Those items appear in the first open Mod Matrix slot as the source and destination, respectively
4. Set the modulation amount with the lower Control knob.

Page Recall: Envelopes

The first press of an ENV button selects page 1, and pressing it repeatedly selects the other pages. But let's say you're editing a parameter on page 3 and want to do the same for another envelope. You can jump straight to that same page by holding [SHIFT] and selecting the next envelope, saving several steps.

WHAT'S AN LFO?

LFO is an abbreviation for Low Frequency Oscillator. LFOs are the cause of familiar effects like vibrato and tremolo, but they can be used in very complex ways (as the presets will attest). Leviasynth has 5 LFOs that can modulate any available parameter through the Mod Matrix. All 5 have identical parameters, so every description applies equally to all.

LFO features

Leviasynth LFOs might be more flexible than any you have encountered. Here are some highlights:

- Delayed start via Delay and Fade-in parameters
- Adjustable phase: start the modulation from any point in the LFO waveform
- Synchronized or unsynchronized modes
- A wide range of rates, from slow to audio
- Independent LFO per voice
- LFOs can modulate themselves, each other, and/or anything else
- Trigger an LFO once or loop it indefinitely
- Design your own LFO, arpeggio, or mini-sequence with the Step LFO features

LFOs 1, 2, and 3

Leviasynth has pre-wired connections linking LFO 1 to the Digital filter, LFO 2 to the Analog filter, and LFO 3 to the VCA module. More LFOs can be routed to these destinations via *The Mod Matrix (p. 125)*.

LFO parameters: page 1

Parameter	Range	Description
Waveform	Sine, Triangle, Saw Up, Saw Down, Square, Pulse27%, Pulse13%, S&H, Noise, Random, Step	Selects LFO waveform. "Step" is user-defined
Rate	Speed mode = Slow BPM = Off: 0 to 25 Hz BPM = On: 272' to 1/4 Speed Mode = Fast BPM = Off: 5 Hz to 150.0 Hz BPM = On: 64' to 1/64T	Sets duration of LFO cycle
Speed Mode	Slow, Fast	Toggles LFO between two Rate ranges
Trig Sync	Poly, Single, Off	Poly: independent LFO per voice Single: One LFO affects all voices; each new note retriggers that LFO Off: One LFO affects all voices & runs freely
Delay	Speed mode = Slow BPM = Off: 0 to 60 seconds BPM = On: 0 to 192' (48 bars) Speed Mode = Fast BPM = Off: 0 to 32.0 seconds BPM = On: 0 to 64' (16 bars)	Length of time before LFO begins
Fade In	Speed mode = Slow BPM = Off: 0 to 600 seconds BPM = On: 0 to 192' (48 bars) Speed Mode = Fast BPM = Off: 0 to 36.0 seconds BPM = On: 0 to 64' (16 bars)	Length of time LFO takes to rise to maximum amplitude
Quantize	(various)	Reduces LFO resolution
Level	0.0 - 128.0	Maximum amplitude of LFO

There's a quick way to set the LFO rate: While on page 1, hold [SHIFT] and then hold Soft button 2 for the desired period of time. This works with BPM On or Off.

Some of those parameters may need explaining.

TRIG SYNC

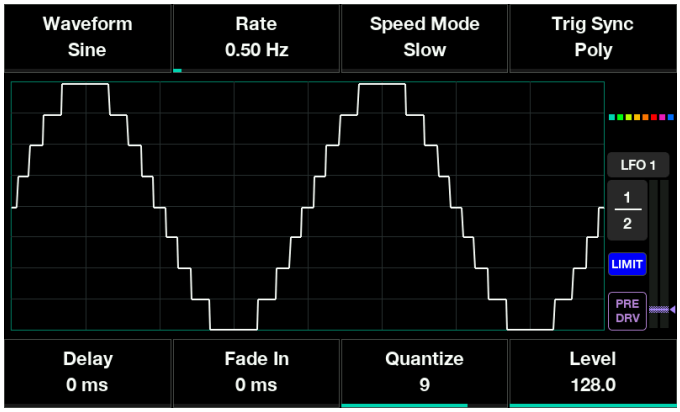
This parameter governs whether an LFO resets with each new note or operates independently per voice.

- **Poly**: Each new note triggers its LFO independently. Use this for lush pads, etc.
- **Single**: One LFO affects all voices; each new note retriggers that LFO.
- **Off**: The LFO runs freely and affects all voices. It could show up anywhere in its cycle.

LFO QUANTIZE

The Quantize option can add a stepped effect to the LFO output. For example, it can turn a sine wave into a complex LFO.

1. Press [INIT] twice.
2. Hold [LFO 1] and press [OSC 1] to create a mod route.
3. With Control knob 2, set the Destination to Pitch.
4. Set the mod depth to 120.0 with Control knob 6. Hold [SHIFT] to fine-tune the value.
5. [EXIT] and press [LFO 1] to access that module.
6. Use Control knob 2 to set Rate to 0.50 Hz.
7. Hold a note and turn Control knob 7 slowly through the Quantize values.
8. When Quantize = 9 the LFO becomes a 2-octave diminished arpeggio.
9. Try other Quantize values, waveforms, and rates. The results can be very complex!



LEVEL

Why is this parameter needed, when the Mod Matrix lets you set a level for each modulation route? That's a good question with a great answer.

For example, imagine that an LFO is routed to multiple destinations in the Mod Matrix (which is often the case). This parameter makes it possible to adjust all of those routes with a single edit, rather than needing to adjust each mod route separately. The LFO Level parameter is a fine-tune control that allows you to dial in a modulation amount with precision.

LFO parameters: page 2

Control knob	Parameter	Range	Description
1	Steps [1]	2-64	When LFO = Step, specific LFO points and values can be defined. For all other waveforms, this defines the number of steps you can trigger.
2	Smooth [2]	0-127	Slows waveform changes
3	BPM Sync	Off, On	Toggles LFO rate from Hz to synchronized time divisions
4	One-Shot	Off, On, Step	On = LFO completes 1 cycle and stops, Step = advance LFO by one step per trigger
5	Phase	0° - 360°	Defines starting point of LFO waveform
6	Phase Stagger [3]	0° - 360°	Offsets the phase of LFOs for each voice.
7	Semi Lock [4]	Off, On	Displays steps in semitone amounts inside the Step Edit page
8	Step Edit... [4]	(access)	Enters the Step Edit page

[1] Only visible when Waveform = Step, or for all other waveforms when One-Shot = Step.

[2] When One-Shot = Step the Smooth setting has no effect. It is applied only when One-Shot = ON or OFF.

[3] Only visible when Trig Sync = OFF on page 1.

[4] Only visible when Waveform = Step on page 1.

Four of those parameters are hidden in some cases (Steps, Phase Stagger, Semi Lock, and Step Edit). We've included them all below.

STEPS

This parameter is only visible when the following conditions are met:

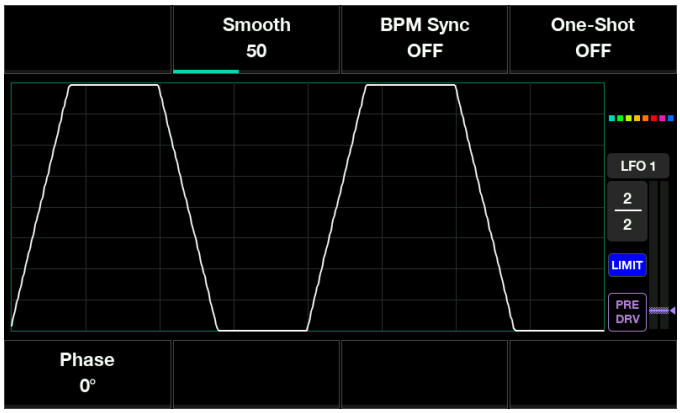
- When Waveform = Step, or
- For all other waveforms, when the One-Shot parameter = Step.

With Waveform = Step, you can define the modulation amount for up to 64 steps. When Semi Lock = On an LFO can be a bass line or melody!

For all other waveforms (i.e., when Waveform is not Step), when One-Shot is set to Step, the waveform is split into this number of sections, with each section treated as a step that can be triggered.

SMOOTH

Also known as "slew", this parameter softens the transitions from one amplitude of an LFO to the next. When a waveform with abrupt changes is selected (Saw, Square, S&H, Step) the Smooth parameter makes the LFO "glide" between adjacent values. At the highest setting the square and triangle LFO waveforms are identical.



BPM SYNC OPTION

When the BPM Sync parameter is set to On the LFO rates are represented by rhythmic values. When the Speed Mode = Fast, values range from 1/64T (a sixty-fourth note triplet) to 64' (64 quarter notes, or 16 measures in 4/4 time); when the Speed Mode = Slow, values range from 1/4 (quarter notes) to 272' (68 measures!). Dotted values are also available. Here are some examples of how the values are shown:

Value	Duration
64'	Sixty-four quarter notes, or sixteen measures
8'	Eight quarter notes, or two measures
1/1	Whole note, or one measure
1/16Dot	Dotted sixteenth note
1/16	Sixteenth note
1/16T	Sixteenth note triplet

ONE-SHOT

An LFO will run its course only once if this parameter is set to On. For example, it could:

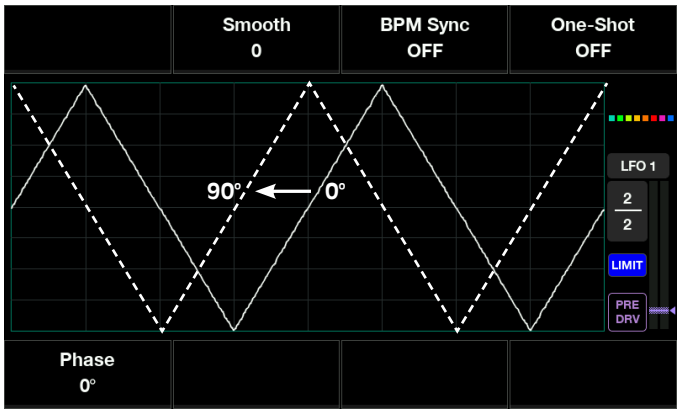
- allow a single warble from a sine wave LFO
- give a short burst from the Noise waveform
- run the Step LFO sequence one time, etc.

When One-Shot = Step, the subdivided waveform or Step LFO sequence will advance by one step with each trigger.

"Step LFO sequence?" For an explanation of that, see that section a few paragraphs from here. To learn how One-Shot mode and Step LFOs work together, see *One-Shot LFOs: Step Advance (p. 82)*.

PHASE

An LFO doesn't need to start at a zero-crossing point. This parameter lets you specify the exact point at which it will begin, as measured in degrees from zero to 360.



PHASE STAGGER

This is only visible when Trig Sync = Off (i.e., when LFOs are free-running.) The stagger value defines the amount of LFO phase offset between adjacent voices. For example, if Phase Stagger is set to 10°, the LFO for voice 1 starts at 0°; the LFO for voice 2 starts at 10°; the LFO for voice 3 starts at 20°; etc. (Remember, when LFOs are free-running, they're already doing their thing in the background before the notes are triggered.)

In Single mode this means the LFOs for voices 1 and 16 would be out of phase by 150°. If Phase Stagger is increased to 20°, the LFOs for voices 1 and 16 are now 300° out of phase.

In practical terms: If you play 8 notes at the same time, the LFOs for those 8 voices will peak and trough at different times, giving them an independent quality similar to the variations of vibrato in an orchestral string section. This can also breathe even more life into the emulation of an analog synthesizer, or tarnish the sterility of an otherwise digital-sounding patch (which can be a good thing). Vive la différence!

The Step LFO

The Step LFO lets you define up to 64 stages through which the LFO will pass. Its parameters become visible when the LFO Wave selection is set to Step. After that, three more parameters appear on Page 2: Steps, Semi Lock, and Step Edit.

Those are described briefly in the previous chart, and we'll cover Semi Lock more thoroughly in a later section. Let's work with Semi Lock Off for now.

1. Press [INIT] twice to initialize the patch.
2. Hold [LFO 1] and press [OSC 1] to create a mod route.
3. Use Control knob 2 to select Pitch as the destination parameter.
4. Use Control knob 6 to set Depth to 128.0
5. Press [EXIT], then access [LFO 1]
6. Select the Step waveform with Control knob 1
7. Select page 2 with the Page down arrow
8. Leave the Steps value at 8 for now.
9. Use Soft button 8 to access the Step Edit page.
10. Notice that steps 1, 2, and 3 are set to 60.0, -60.0, and 0.0, respectively. Note: Multiples of 5 provide specific pitches, but intermediate values can be used.
11. Hold a note. Three octaves of the same pitch will play. The third pitch is longer because the last six steps are set to the same value.
12. Keep holding the note and notice that the 8-step sequence repeats.
13. Enter values on the other steps to see how that affects the Step LFO output.

Let's dive deeper into the Step LFO.

SEMI LOCK

Semi Lock displays the steps inside the Step Edit page in semitone values. This makes it easy for an LFO to play standard 12-tone pitches. Let's try with Semi Lock On this time.

1. Press [INIT] twice to initialize the patch
2. Hold [LFO 1] and press [OSC 1] to create a mod route
3. Use Control knob 2 to select Pitch as the destination parameter.
4. Use Control knob 6 to set Depth to 128.0
5. Press [EXIT], then access [LFO 1]
6. Select the Step wave with Control knob 1
7. Select page 2 with the Page down arrow
8. Leave the Steps value at 8 for now.
9. Use Control knob 7 to set Semi Lock to On
10. Use Soft button 8 to access the Step Edit page
11. Notice that steps 1, 2, and 3 are set to +12 semi, -12 semi, and 0 semi, respectively. These are the chromatic equivalents of the non-Semi Lock values.
12. Hold a note. Three octaves of the same pitch will play.
13. Enter values on the other steps to see how that affects the Step LFO output.

But what if a step value isn't a multiple of 5? Continuing with the previous example:

1. Press [EXIT] and use Control knob 7 to set Semi Lock to Off
2. Access the Step Edit page via Soft button 8 and set any step to a value that is not a multiple of 5 (e.g., 9.9)
3. Press [EXIT] and use Control knob 7 to set Semi Lock back to On
4. Enter the Step Edit page again (Soft button 8). The non-multiple step has an asterisk (e.g., +1 semi*)
5. As the related Control knob is turned the value changes to exact semitone values and the asterisk disappears.

Let's try a Step LFO with more than 8 steps.

1. Press [EXIT] and use Control knob 1 to select a different number of Steps
2. Enter the Step Edit page via Soft button 8
3. Use the Page up/down buttons to access steps 9-16, 17-24, etc.
4. Select semitone values for each step as needed.

To dive deeper, press [EXIT] and try other settings for Smooth, Rate, BPM = On, etc. With 64 steps and a synced LFO rate of 1/16, for example, an LFO can play a 4-bar melody!

Remember, in order for the Step LFO semitone values to quantize to the chromatic scale, be sure to do the following:

- Set the LFO output level to 128.
- In the Mod Matrix, route the LFO to the pitch of an oscillator with a depth of 128.

With those conditions met, the Step LFO semitone values will always match the 12 pitches in the chromatic scale.

ENTER NOTES WITH PADS

You can select semitone values inside the Step Edit page with the pads. Press Octave Up/Down to reset the range, hold a soft button, then use pads 1-13 to select a value between 0 and + 12 semitones. Press Octave Down to enter values between -12 and + 3 semitones.

You might hear the wrong pitch at first if you hold Soft button 1 and play a note to set the semitone value for step 1. The reason: LFO1 starts as step 1 is entered, and it restarts with every new note (unless Trig Sync = Off). The result: double-transposition of the first note. The right pitch will play when the LFO loops.

ONE-SHOT LFOS: STEP ADVANCE

The LFO One-Shot mode has a third option: Step. When both the LFO Wave and One-Shot mode are set to Step, each time that LFO is triggered it advances to the next Step in the sequence.

Other parameters affect how this works. But for now, let's set up a crazy little Step LFO! Starting in Single mode:

1. Press [INIT] twice, then press [VOICE]
2. Set Polyphony to Poly Reassign with Control knob 1. This is so Voice 1 is triggered each time in step 12.
3. Press [LFO 1] and select Waveform = Step with Control knob 1.
4. Press [LFO 1] again to access page 2.
5. Select One-Shot = Step with Control knob 4.
6. Use Control knob 7 to set Semi Lock to ON. This provides semitone values in the Step Edit menu.
7. Press Soft button 8 to enter the Step Edit menu.
8. Select values between -12 semi and +12 semi.
9. Hold [LFO 1] and press [OSC 1] to set up a mod route.
10. Select Pitch as the destination parameter with Control knob 2
11. Set a mod depth of 128 using Control knob 6.
12. Play the same note 8 or more times. Each time the LFO is triggered the sequence advances by one Step!

Here are some important notes about Step LFOs:

- Be sure to review the *Semi Lock (p. 81)* section for other ways to make the Step LFO sequence conform to the chromatic scale.
- When One-Shot = Step the Smooth setting has no effect. It is applied only when One-Shot = ON or OFF.
- Step LFOs advance differently depending on the Polyphony setting on page 1 of the Voice module. See the next section for details.
- Most of the other LFO waveforms will advance step-by-step when One-Shot = Step. Try this with Waveform = Saw, for example. For extra fun, add an LFO Quantize value and play the same key repeatedly.

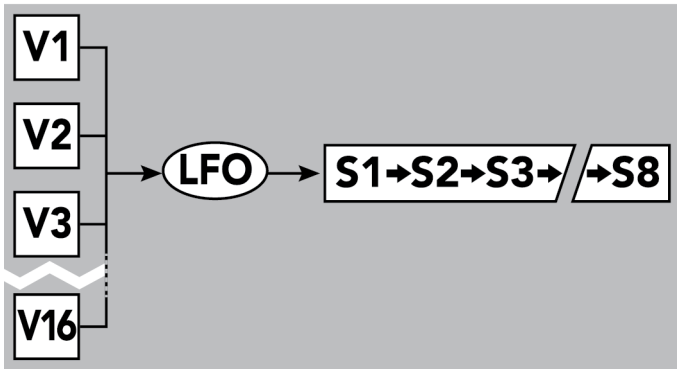
STEP ADVANCE OPTIONS

In this section we'll learn about different ways to make the Step LFOs advance.

LFO: Trig Sync settings

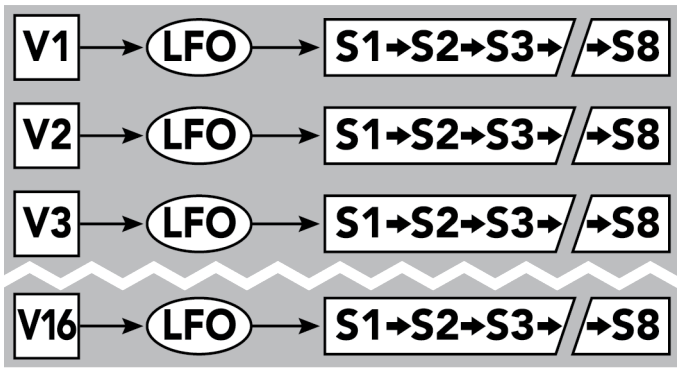
The LFO Trig Sync settings are found and described in *LFO parameters: page 1 (p. 78)*. In this section we'll focus on two of those settings (Single and Poly) and how they are used to advance a Step LFO sequence. Remember: there are 5 LFOs, and it's possible to have each one configured differently.

Trig Sync: **Single** means that all voices share the selected LFO. Triggering any voice advances that Step LFO sequence for all voices.



Trig Sync: Single (V = Voice / S = Step)

Trig Sync: **Poly** means that each voice has its own copy of the selected LFO. Triggering a voice advances the Step LFO sequence only for that voice, and only for that copy of the LFO.



Trig Sync: Poly (V = Voice / S = Step)

When Trig Sync = Poly the Polyphony settings have a big impact on Step Advance behavior. Be sure to read the information in the next section to get the full picture.

Voice: Polyphony settings

The LFO Trig Sync settings also interact with the Polyphony settings in the Voice module. For full descriptions, see *Polyphony settings (p. 89)*. In this section we'll focus on two of those settings (Poly Rotate and Poly Reassign) and how they are used to advance a Step LFO sequence. Remember: There are 5 LFOs, and it's possible to have each one configured differently.

Note: When Trig Sync = Single the shared Step LFO advances the same way regardless of the Polyphony setting. So for these descriptions we will assume that Trig Sync = Poly. Remember: This is the setting where each voice has a dedicated copy of the selected LFO.

Poly Reassign allocates the voices based on how many voices are already active. If you start by playing only one note, you're playing Voice 1. If you hold that note and play another one you're playing voice 2, and so on. So when you're working with a Step LFO and want the sequence to advance for Voice 1, play only one note and play it repeatedly. If you want the sequence to advance for Voice 2, hold Voice 1 and play a second note, and so on.

To summarize:

- If the first note is played staccato by itself, Voice 1 is triggered each time and its dedicated LFO outlines the sequence with each successive trigger.
- If the first note is held and another note is played, Voice 2 is triggered and its dedicated LFO begins its sequence with the same results, and so on through all available voices and their LFOs.

Poly Rotate. The One-Shot: Step setting is voice-independent, which means that with Trig Sync = Poly each of the voices will follow its own LFO step pattern. And when Polyphony = Poly Rotate, every note you trigger will take the first available voice, and make that LFO advance by one step for that specific voice.

For example, when you first select the patch:

1. The first triggered note uses Voice 1 and LFO step 1
2. The second triggered note uses Voice 2 and LFO step 1 (not step 2)
3. The third triggered note uses Voice 3 and LFO step 1, etc.

After you cycle through all of the voices and return to Voice 1, it plays LFO step 2, then Voice 2 plays step 2, Voice 3 plays step 2, etc.

To put it another way:

- If one note is played staccato by itself, it must be played 16 times (8 times in Multi mode) before the LFO advances to the next step. This is because Leviasynth is cycling through all available voices, and each one has a dedicated LFO that will follow the sequence order independently from the other voices.
- If a note is held and another is played, that note must be played 15 times (7 in Multi mode) before its LFO advances, because the engine is cycling through the remaining voices, and so on.

MORE STEP LFO IDEAS

Here are more ways to use the Step LFO:

- The maximum Step values are +/- 64.0, so the total range is a little wider than an octave above and below the root pitch.
- Try using one or more oscillators with a Step LFO and BPM set to ON. Different Rate values provide interesting rhythms.
- Oscillators 1 and 2 could play step sequences while Osc 3 drones on the root pitch, for example.
- Try other values of the Steps parameter to make time signatures like 5/4, 6/8, 7/8, etc.
- To hold a pitch for one or more steps, use the same value as the previous step or the next one.
- For longer step sequences, set the LFO 2 Delay so it comes in after LFO 1 (and set LFO 1 to One-Shot = On).
- The Copy feature described below is very useful here: Copy one LFO to another and make slight changes to create counterpoint or to harmonize. Be sure to copy *The Mod Matrix (p. 125)* settings also.
- You can invert a melody with mod route level of -128.
- Remember, if you run out of LFOs, a looping envelope can be used. With 13 envelopes there are an unimaginable number of options.

LFO SHORTCUTS

These are described elsewhere, but they're so easy and useful we've included them here too.

Copy LFO A to LFO B

1. Hold [SAVE]
2. Press and release the source (LFO A)
3. Press and release the destination (LFO B)
4. Release [SAVE].

Create a direct Mod route

To set up a mod route to a specific parameter from inside a module:

1. Hold [LFO X] to select the source
2. Press the Soft button for the target parameter, then release both buttons
3. Those appear in the first open Mod slot as the source and destination, respectively
4. Set the modulation amount with the lower Control knob.

Page Recall: LFOs

The first press of an LFO button selects page 1, and pressing it repeatedly selects page 2. But let's say you're editing a parameter on page 2 and want to do the same for another LFO. You can jump straight to that same page by holding [SHIFT] and selecting the next LFO, saving an extra press of that button.

There is one exception to this shortcut: When you're inside the Step Edit page, this technique jumps to the next-highest level page for the other LFO (i.e., to LFO page 1 or 2). See also *Page memory (p. 135)* for a list of exceptions in Multi mode.

THE EFFECTS

The Leviasynth voice engine is so powerful that it only made sense to pair it with an equally powerful effects section. There are four independent effect modules available, two of which provide awe-inspiring delay and reverb effects, while the other two are the aural equivalent of a set of Swiss Army knives. Any tool you need for your music, Leviasynth has it.

Some parameter names are shown below in [brackets]. These are available as mod destinations for Macros and the Mod Matrix. The values for these parameters have finer increments than the others, which ensures maximum resolution when they are being modulated.

Pre- and Post-FX

The only difference between these two FX modules is that one precedes the Delay and Reverb and the other follows them. They serve different purposes due to their placement in the signal path, so they will often have different settings. But since their FX types and parameters are identical, both modules will be covered in this section.

These are the FX types available for the Pre-FX and Post-FX modules:

- Chorus • Flanger • Rotary
- Phaser • Lo-Fi • Tremolo
- EQ • Compressor • Distort

Each FX type has preset templates that can be used as starting points for your own creations. When the patch is saved the FX settings are preserved.

BYPASS

This is the default option. To disable the effect module for the current patch, set Pre-/Post-FX Type to Bypass.

Chorus

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the chorus rate
4	[Depth]	0.0-128.0	Controls the chorus depth
5	Offset	+/- 180°	Sets initial phase of effect relative to input
6	Feedback	+/- 63	Feeds chorus back into itself (positive or negative polarity)
7	Mono/St	Mono, Stereo	Selects mono or stereo output
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Flanger

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the flanger rate
4	[Depth]	0.0-128.0	Controls the flanger depth
5	Offset	+/- 180°	Sets initial phase of effect relative to input
6	Feedback	+/- 63	Feeds flanger back into itself (positive or negative polarity)
7	Mono/St	Mono, Stereo	Selects mono or stereo output
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Rotary

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Woofer Rate]	0.02-10.0 Hz	Sets speed of low rotor
4	[Horn Rate]	0.02-10.0 Hz	Sets speed of high rotor
5	Lo-Depth	0-127	Controls depth of low rotor

6	Hi-Depth	0-127	Controls depth of high rotor
7	Low/High	-/+ 63	Volume balance between the low and high rotors
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Phaser

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the rate of the phase modulation
4	[Feedback]	+/- 63.0	Feeds phaser back into itself (positive or negative polarity)
5	Depth	0-127	Controls the depth of the phase modulation
6	Phase	0-127	Adjusts lowest frequency point of phase modulation
7	Offset	+/- 180°	Controls amount of phase offset relative to input
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Lo-Fi

Control knob	Parameter	Range	Description
2	Preset	1-2	Selects preset
3	[Cutoff]	160-20,000 Hz	Filter cutoff frequency
4	[Resonance]	1.0-12.0	Filter resonance
5	Filter Type	Thru, PWBass, Radio, Tele, Clean, Low	Selects filter model
6	Output	- 6 / + 36 dB	Gain compensation control
7	Sampling	44,100-2,756 Hz	Sets downsampling rate
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Tremolo

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the tremolo rate
4	[Depth]	0.0-128.0	Controls the tremolo depth
5	LFO shape	Sine, Square	Selects tremolo waveshape
6	Phase	+/- 180°	Phase relationship of left / right LFOs
7	Pitch Mod	0-127	Controls vibrato depth
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

EQ

Control knob	Parameter	Range	Description
2	Preset	Flat, LowBoost, Bass Cut, High Cut, Smile, Lo-Fi, Warm	Selects preset template
3	[LowGain]	- 36.0 / + 24.0 dB	Controls low frequency cut/boost amount
4	[HighGain]	- 36.0 / + 24.0 dB	Controls high frequency cut/boost amount
5	MidGain	- 36.0 / + 24.0 dB	Controls mid frequency cut/boost amount
6	Xover Lo	32-2,000 Hz	Sets crossover point from low to mid range
7	Xover Hi	512-16,000 Hz	Sets crossover point from mid to high range
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Compressor

Control knob	Parameter	Range	Description
2	Sidechain	Off, BPM Duck, Tap, Mod In 1, Mod In 2	Selects sidechain source: Arpeggiator clock, Tap Tempo button, CV Mod Input 1 or CV Mod Input 2
3	[Ratio]	1.0 :1 to 20.0 :1	Controls compressor strength above threshold
4	[Threshold]	-64.0 to 0.0 dB	Controls level at which compression begins
5	Attack	1-400 ms	Time until maximum compression
6	Release	5-560 ms	Time to zero compression if signal is below threshold
7	Output	0-512	Gain compensation
8	[Dry/Wet]	.0-100.0%	Blends unaffected and affected signals

Distort

Control knob	Parameter	Range	Description
2	Preset	Drive 1-3	Selects a preset template
3	[Drive]	0.0-128.0	Sets the signal level sent to the distortion circuit
4	[Tone]	+/- 63.0	Controls output bandwidth: -63.0 to -0.1: high cut 0.0: bypass 0.1 to 63.0: low cut
5	Asym	0-128	Changes how the clipping effect is applied: 0 = a balanced (symmetrical) output Higher levels = increasingly asymmetrical output
6	Curve	0-128	Changes the saturation curve in the distortion: 0 = an overdrive type of effect Higher levels = increasingly harsh distortion
7	Output	-36 / +24 dB	Gain compensation control
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Delay Types

Leviasynth offers 5 delay types, each with distinct characteristics:

- **Basic Mono** combines the stereo input signal and produces a mono delay.
- **Basic Stereo** preserves the stereo positioning of the input signal.
- **Pan Delay** alternates between the right and left input signals.
- **LRC Delay** outputs the left input, then the right input, then both, and repeats that pattern.
- **Reverse** takes whatever comes in during the delay period and plays it backward.

Delay Parameters

All of the delays have identical parameters, so we'll describe them once.

Control knob	Parameter	Range	Description
2	[Time]	BPM = Off: 1 ms to 3.00 seconds BPM = On: 1/64T to 1/1 Dot	Delay period
3	[Feedback]	0.0-128.0	Fade-out time for delay
4	[Wet Tone]	-/+ 64.0	Filter control for Wet signal: -64.0 to -0.1: Low pass filter 0.0: No filtering 0.1 to 64.0: High pass filter
6	BPM sync	Off, On	Toggles delay sync
7	[Feedback Tone]	0.0-128.0	Feedback high-frequency decay time
8	[Dry/Wet]	0.0-100.0%	Blends uneffected and effected signals

Reverb Types

Leviasynth provides 4 reverb types, each with distinct characteristics:

- Hall
- Room
- Plate
- Cloud

Reverb Parameters

All of the reverbs have identical parameters, so we'll describe them once.

Control knob	Parameter	Range	Description
2	Pre-delay	0.5-250 ms	Length of time before reverb
3	[Time]	120 ms - 90 seconds, Freeze	Decay time of reverb Freeze is indefinite without damping
4	[Tone]	-/+ 64.0	Filter control for Wet signal: -64.0 to -0.1: Low pass filter 0.0: No filtering 0.1 to 64.0: High pass filter
6	[Hi Damp]	0.0-128.0	Reverb high-frequency decay time
7	[Lo Damp]	0.0-128.0	Reverb low-frequency decay time
8	[Dry/Wet]	0.0-100.0%	Blends uneffected and effected signals

Freeze the Reverb

While on Reverb module page 1, hold [SHIFT] and press Soft button 3 and the reverb time will jump to Freeze. If the Hi / Lo Damp parameters are set to zero, the Freeze setting will hold the reverb indefinitely. Any notes that are played will be added to the effect.

A Macro button can toggle the Freeze value on and off; just set the Button Value to 128.0. To learn more about setting up a Macro, see *Mastering the Macros (p. 121)*.

MOD ROUTE SHORTCUT

Here's how to set up mod routes quickly from an Envelope or LFO to an effect:

- Hold the module button for the desired source
- Press the module button for the destination. This will create a mod route in the Mod Matrix at the first available slot with the first parameter of the effect selected.
- Change the selected parameter if needed
- Set the mod amount with the appropriate Control knob.

Remember: Not all FX parameters are available as mod destinations.

GLOBAL FX BYPASS

You can also enable and disable the Pre/Post FX, the Delay, and/or the Reverb for all patches (i.e., globally). See *FX Bypass Menu (p. 157)*.

THE VOICE MODULE

Technically the Voice module isn't in the signal path, so it isn't located in the Module Select area of the top panel. But its functions have a significant impact; many settings related to the playability and performance of the patch are found here.

VOICE PARAMETERS: PAGE 1

Control knob	Parameter	Range	Description
1	Polyphony	Poly Rotate, Poly Reassign, Mono, Mono Lo, Mono Hi, Unison, Unison Lo, Unison Hi, Unison Poly	Sets polyphony mode, note priority
2	Density [1] Voice Limit [2]	1-16 (see descriptions)	Maximum number of voices in Poly, Unison, and Unison Poly modes
3	Unison Detune [3]	0-127	Detune amount in Unison and Unison Poly modes
4	Analog Feel	0-127	Adjusts parameter drift (see below)
5	Random Phase	Off, On	Toggles random phase per voice
6	Panner [4]	Alter Loop, Alter LoopMir, Alter, Alter Mir, Alter Rev, Alter RevMir, Rotate Loop, Rotate LoopMir, Rotate, Rotate Mir, Sides, Sides Mir, Sides Rev, Sides RevMir, Random, Mod Only	Selects stereo behavior of triggered notes
7	Panner Width [4]	0-127	Stereo dispersion of triggered notes
8	Panner Mode [4]	Sequential, Reset	Selects whether the stereo cycle starts from the next pan position or from pan position 1

[1] Visible if Polyphony = a Unison mode

[2] Visible if Polyphony = a Poly mode

[3] Hidden if Polyphony = a Poly or Mono mode

[4] Panner + Panner Mode do nothing if Panner Width = 0

Polyphony settings

There are nine settings here, but they fall into three main groups: Poly, Mono, and Unison.

POLY ROTATE AND POLY REASSIGN

The Poly settings let the Leviasynth voices trigger independently. The table shows how Poly Rotate and Poly Reassign respond to triggered notes.

Polyphony Mode	Method	Result
Poly Rotate	Repeat 1 note	V1, V2, V3, V4, etc.
	Repeat 4-note chord	V1-4, V5-8, etc.
	Hold note 1 Repeat note 2	V1 V2, V3, V4, etc.
Poly Reassign	Repeat 1 note	V1, V1, V1, V1, etc.
	Repeat 4-note chord	V1-4, V1-4, etc.
	Hold note 1 Repeat note 2	V1 V2, V2, V2, etc.

Polyphony mode has a big influence on how the LFOs behave, especially the Step LFOs. For more information, see *Step Advance options (p. 82)*, especially the section titled Voice: Polyphony settings.

When one of the Poly options is selected, the Voice Limit parameter appears. This specifies how many voices a patch can use. If you're wondering why anyone would want to do that, see *Voice Limit (p. 90)*.

MONO, MONO LO, MONO HI

"Mono" is short for monophonic. When Polyphony = Mono you can only play one note from the pads. It always triggers voice 1. But the Panner settings can make that one voice can move around the stereo field, as long as the Panner Width value is higher than zero. The higher the value, the more the voice will move.

There are three Mono options: Mono, Mono Lo, and Mono Hi. These are explained in *Lo, Hi, or both (p. 90)*.

UNISON, UNISON LO, UNISON HI

The Unison modes are also monophonic; when Polyphony = Unison you can only play one note from the pads. When these options are selected, two more parameters appear: *Density (p. 90)* and *Unison Detune (p. 90)*.

Unlike when Polyphony = Mono, you can use the Density parameter to stack up to 16 voices on that one note in Single mode. The Unison Detune parameter governs the amount of detuning between the voices.

Note: A Unison patch with a Density value of 9+ voices will be limited to 8 voices when used in Multi mode. This is the maximum number of voices available for each part. You'll still see values of 1-16 when editing a Multi part, but the values of 9-16 will only provide 8 voices.

The Panner settings can be used to spread those voices across the stereo field, as long as the Panner Width value is higher than zero. The higher the value, the wider the stereo spread.

Unison also has three options: Unison, Unison Lo, and Unison Hi. These are explained in *Lo, Hi, or both (p. 90)*.

UNISON POLY

When Unison Poly is selected, two more parameters appear: *Density (p. 90)* and *Unison Detune (p. 90)*.

Unison Poly is a special case: Play one note and all voices are heard, up to the Density limit; play a chord and the Density setting allocates voices evenly among the voices that have been triggered.

Note: A Unison Poly patch with a Density value of 9+ voices will be limited to 8 voices when used in Multi mode. This is the maximum number of voices available for each part. You'll still see values of 1-16 when editing a Multi part, but the values of 9-16 will only provide 8 voices.

The Panner settings can be used to spread those voices across the stereo field, as long as the Panner Width value is higher than zero. The higher the value, the wider the stereo spread.

LO, HI, OR BOTH

The Mono and Unison modes have additional Lo- and Hi- options. Here's the difference:

- **Lo** (low note priority): The only way to trigger a new note is to play one below the held note.
- **Hi** (high note priority): The only way to trigger a new note is to play one above the held note.
- If an option doesn't say "Lo" or "Hi", it's both: A new note can be triggered by any note above or below the held note.

Density

The Density parameter appears when one of the Unison modes is selected (including Unison Poly). It lets you stack up to 16 voices on a single note if you like.

But remember: A Density value of 9+ voices will be limited to 8 voices when used in Multi mode. You can still select values of 1-16 when editing a Multi part, but the values of 9-16 will only provide 8 voices.

Voice Limit

The Voice Limit parameter appears when one of the Polyphonic modes is selected (*Poly Rotate and Poly Reassign (p. 89)*). It lets you set the number of maximum number of voices that can be played from the pads when a patch is selected. This can be different for each patch.

One way to use the Voice Limit parameter would be to recreate not only the sound, but the behavior of a certain 5-voice synthesizer, for example: the way it plays, the way it reallocates the voices (or doesn't) when polyphony is exceeded. But feel free to select a higher Voice Limit value. We'd love to hear that great patch with a bunch of huge chords on your next hit!

But remember: A Voice Limit value of 9+ voices will be limited to 8 voices when used in Multi mode. You can still select values of 1-16 when editing a Multi part, but the values of 9-16 will only provide 8 voices.

Unison Detune

The Unison Detune parameter is only active when one of the Unison modes is selected, including Unison Poly. Density sets the number of voices that can be triggered by a single note. Unison Detune offsets the tuning of each of those voices equally within the range set by the Unison Detune value.

How does Analog Feel?

One thing that makes an analog synthesizer seem so "alive" is its inherent instability. This unpredictability is an issue not only in the tuning of the oscillators but throughout the signal path. The Analog Feel parameter allows you to dial in as much

of this behavior as you like, from “a little bit” to an amount that would summon a repair tech if you hadn’t done it on purpose.

Random Phase

Part of what breathes life into the sound of an analog synth is that its oscillators are always running; waveforms could be anywhere in their cycles when they are triggered. It’s the nature of their circuits; they must be told to reset. This parameter emulates that behavior by telling the digital oscillators not to reset their phase to 0° when a voice is triggered.

The Panner parameters

The Panner feature provides a lot of ways to inject stereo motion into a patch. But before we describe the three Panner parameters, it’s important to know:

- You won’t hear what the Panner feature does unless the Panner Width value is above zero.
- Pan positions are not tied to a specific voice number. The results depend on the interaction between the *Polyphony settings (p. 89)* and the Panner settings described below.

PANNER

Use Control knob 6 to select one of 16 stereo sequences for the triggered notes. There’s a visual representation of each at the end of this chapter (see *Panner Maps (p. 98)*).

PANNER WIDTH

This parameter sets the amount of stereo spread between the triggered notes. Its value needs to be greater than zero or else the other Panner settings are irrelevant.

PANNER MODE

There are two settings for Panner Mode: Sequential and Reset.

- Sequential means the engine selects a new position every time a voice is triggered, and it keeps going like that until the stereo sequence is complete. Then it starts from position 1 again.
- Reset means that if all voices have faded to zero, the stereo sequence starts at position 1 again. If that note is held, the next voice will occupy pan position 2, and so on. If you play a 4-note staccato chord, those 4 voices are given positions 1-4 each time. There could be a variation of position depending on which note triggers which voice.

As mentioned earlier, which voice a note uses is determined by the *Polyphony settings (p. 89)*.

Any voice can end up in any pan position; they aren’t hardwired together.

The stereo sequence is determined by the selected Panner option. For a chart that may help visualize the different Panner options, see the list of *Panner Maps (p. 98)*].

Panner and Multi mode

Let’s take a quick look at how Panner works inside Multi mode.

1. Press [MULTI] to enter Multi mode.
2. Press [INIT] twice to initialize the parts in the Multi.
3. Press [MULTI] again to enter Multi Edit mode.
4. Use Control knob 1 to select KeySplit mode.
5. Hold soft button 2 and press pad 9 to set the split point.
6. Press [LOWER] to select the Lower part for editing.
7. Press [OSC 1] and change the waveform to Saw.
8. Press [UPPER] to select the Upper part for editing.
9. [OSC 1] is still selected. Change the waveform to Square.
10. Press [LOWER] and [UPPER] to edit BOTH the Upper and Lower parts.
11. Press [VOICE] and set Panner = Rotate Loop, Panner Width = 127.

After following steps 1-11, watch the voice indicators in the center and proceed.

- Play pad 9 sixteen times to trigger the Upper part. Voices 9-16 follow panner positions 1-8 from left to right and then positions 9-16 from right to left.
- Play pad 1 sixteen times to trigger the Lower part. Voices 1-8 follow panner positions1-8 from left to right and then positions 9-16 from right to left.

Try different panner settings with *Poly Rotate and Poly Reassign (p. 89)* . *Panner Maps (p. 98)* show what each stereo sequence does. To learn more about editing a Multi, see *Multi Edit mode (p. 132)* .

Note that the Upper and Lower parts can have independent Panner settings and Polyphony settings. The stereo outputs of a Leviasynth are a lively place to be!

VOICE PARAMETERS: PAGE 2

Control knob	Parameter	Range	Description
1	Pitch Bend	0-24	Positive/negative pitch bend range in semitones
2	Vintage Digital	Off, On	Emulates a certain lo-fi digital sound from the mid-1980s.
3	Bit Depth	(various)	Reduces audio resolution before reaching the filters
5	Vibrato Amount	0.0-12.0	Sets response range to incoming mod wheel messages (MIDI CC #1)
6	Vibrato BPM	Off, On	Toggles Vibrato from Hz to tempo divisions
7	Vibrato Rate	BPM = Off: 0.30-10.00 Hz BPM = On: 1/4 to 1/32Dot	Sets rate of Vibrato effect
8	Vibrato Wave	Sine, Triangle, Square, S&H, Noise	Selects waveform for the Vibrato effect

Pitch Bend

This parameter lets incoming pitch bend messages cover up to a 4-octave range: 2 octaves up and 2 octaves down (+/- 24 semitones). You can set the range to a whole step, a fifth, or whatever you prefer. The setting is saved with the patch.

Vintage Digital

When enabled, Leviasynth adopts the aliasing characteristics of the most popular digital synth of the mid-1980s.

Bit Depth

Lower values of Bit Depth degrade a digital signal by reducing its resolution. At its most extreme settings the original sound is unrecognizable. It's like a pixelated photograph for the ears!

The output resolution of a Leviasynth patch can be reduced gradually to 4 bits, with many intermediate values. Let's try an example starting in Single mode:

1. Initialize the patch by pressing [INIT] twice.
2. Press [OSC 1] and use Control knob 2 to set the Wave to Triangle.
3. Press [VOICE] twice to reach page 2.
4. Hold a low note and use Control knob 3 to audition the BitRedux settings.
5. Note how the sound first becomes 'crispy', and then gradually degrades as the value approaches 4 bits.
6. At 4 bits the pretty little triangle waveform sounds more than a bit nasty.
7. Switch between [LEVEL] and Voice page 2 while repeating step 4. Your eyes will confirm what your ears hear: the triangle looks more "crispy" as Bit Depth decreases.
8. Experiment with different waveforms and BitRedux values. Every combination has its own character!

Bit Depth includes standard values such as 16-, 12-, and 8 bits. But there are timbres ranging from the beautiful to the malevolent lurking in the depths of 10, 7, and 5, etc. Try Bit Depth on your favorite patch and see what happens!

The bit reduction process takes place before the signal is passed to the filters. The output of the Digital Filter, the Analog Filter, and the Effects are not bit-reduced. But if you can't get enough of it, the *Pre- and Post-FX (p. 85)* both have a Lo-Fi type that can thrash the signal in glorious ways.

Vibrato settings

The Vibrato feature provides a sixth LFO that modulates the pitch of all 8 oscillators at once. It is controlled by incoming mod wheel messages (MIDI CC #1). This avoids having to use a mod route to make the same connection. An external mod wheel can also be used for other purposes through the Mod Matrix.

The Vibrato Rate locks to tempo when the Vibrato BPM parameter = On. This enhances the musicality of the vibrato; singers and musicians do this naturally to match the music.

Vibrato Wave has 5 options to further enhance the expressivity of your playing. Try the various waves with different amounts and rates. The effect can be subtle or extreme, depending on the mood you want to convey.

VOICE PARAMETERS: PAGE 3

Control knob	Parameter	Range	Description
1	Glide	Off, Glide, Glissando	Toggles effect, selects type
2	Glide Time	0-127	Controls Glide rate (hidden if Glide = Off)
3	Glide Curve	Exp (-64) > Lin (0) > Log (64)	Sets Glide curve (hidden if Glide = Off)
4	Glide Legato	Off, On	If On, only legato playing activates Glide (hidden if Glide = Off)
5	OSC Stereo [1]	Off, On	All oscillators become stereo. Cuts polyphony in half.
6	OSC Pan [2]	Carrier Only, Mod Only, Both	Decides which oscillators will be panned
7	Carrier detune [2]	+/- 20 cents	Detunes the stereo halves of the carrier oscillators

[1] When Osc Stereo = On, each oscillator gains a Pan parameter on *Oscillator settings: page 5 (p. 42)*.

[2] These parameters are only visible when Osc Stereo = On.

Glide settings

When the Glide effect is enabled it reveals another three parameters on Voice page 3. The same thing happens when the Glide button is toggled on the top panel. Here's a description of each.

GLIDE VS. GLISSANDO

Glide causes the pitch to slide between notes rather than changing in chromatic steps. Glissando provides a "stepped" glide, rather than providing a smooth glide between the start and end notes.

For extra fun, press [VOICE] again to access page 4 and use Control knob 2 to select a non-chromatic scale. The glissando follows the selected scale, which can provide excellent musical results. You may want to use the Key Lock setting, too; this is described on the next page.

TIME VS. DISTANCE

Time and Distance represent equal time and equal distance respectively. And that means...

- When Time is selected, the glide / glissando covers each interval in the same amount of time. It'll travel 5 octaves in the same amount of time it takes to move between a C and a D in the same octave.
- When Distance is selected, the glide / glissando moves from one note to another at a consistent rate. So it takes 5 times as long to travel 5 octaves as it does to travel 1 octave.

GLIDE CURVES

The **Glide Curves** are similar in shape to the envelope segment curves:

- An exponential curve rises slowly at first and accelerates upward. When moving downward it starts falling quickly and slows down as it approaches its destination.
- A logarithmic curve does the opposite: It rises quickly at first and its rate of change slows as it nears the peak. In the opposite direction it starts falling slowly and accelerates until it reaches its resting state.
- A linear curve rises and falls at the same rate throughout its duration.

GLIDE LEGATO

Enabling the **Glide Legato** setting changes the way Glide works: staccato notes will not glide; notes played in a legato fashion will glide.

Note: Glide Legato can be less predictable when Polyphony mode = Poly. The reason: Each individual voice has its own legato, and legato playing only happens when the same voice is retriggered. For example, if voice 1 is the next one that will be triggered, playing a legato note will glide voice 1 from its current note to the new note.

Osc Stereo settings

At the risk of immodesty, we know Leviasynth sounds amazing. The OSC Stereo feature is one of the reasons why. It converts each of the 8 oscillators into a stereo oscillator, which instantly transforms a patch into a sweet and spacious, creative place to be.

There is more to this feature than its name! It provides adjustable detuning of the carrier oscillators, and lets you apply the oscillator pan settings only to the carriers, or to the modulators, or to both.

Note: As we describe these features we'll use the terms "stereo oscillators" and "stereo voices" interchangeably.

There are a few things to know about stereo oscillators:

- It takes two voices to make one stereo oscillator; one on the left, and one on the

right. This naturally cuts the polyphony in half.

- In Multi mode, Stereo OSC can be enabled independently for the Upper and Lower patches. When the patch assigned to one of the parts has this enabled, its polyphony is reduced from 8 voices to 4 stereo voices. The other part still has 8-voice polyphony.
- When you enable Stereo OSC in the Voice module, each oscillator gains a Pan parameter on *Oscillator settings: page 5 (p. 42)*. This is the parameter that is affected by OSC Pan.

Steering in Stereo

When OSC Stereo is enabled, two more parameters appear: OSC Pan and Carrier Detune.

OSC PAN

This parameter interacts with the now-visible per-oscillator Pan parameter (see *Oscillator settings: page 5 (p. 42)*). This is the parameter that is affected by OSC Pan.

There are three settings for the OSC Pan parameter:

- **Carrier Only** – applies oscillator pan only to the carrier oscillators (the ones tied directly to the audio outputs)
- **Mod Only** – applies oscillator pan only to the modulator oscillators (the ones affecting the carriers)
- **Both** – applies oscillator pan to the carrier oscillators and the modulators.

Here's one way the Osc Pan setting of Mod Only can be applied.

- If a modulator is panned hard left while its carrier is not panned, then the stereo output of the carrier will have one side that is modulated while the other side is not.
- For example, if Osc 1 is the carrier and Osc 2 is the modulator panned hard left, then Osc 1 can be a sawtooth on the left side and a pure sine on the right side.

CARRIER DETUNE

You'll get pleasing results quickly and easily with this parameter. What it does is detune the left and right sides of the carrier oscillators from each other. You can still detune the carriers or modulators independently as needed on *Oscillator settings: page 1 (p. 37)* , but that changes the pitch for the entire stereo oscillator.

Stereo OSC + the Panner

The OSC Stereo feature can work in conjunction with the Panner settings. This opens up a lot of possibilities for motion and timbral variation while you play. For example, if OSC Pan is set to Mod Only and the modulator oscillators are panned hard left, hard right, or both, each triggered note can end up in a new location in the stereo field, while also altering their modulation of the carrier stereo oscillators as they dance between the left and right outputs.

For information about what the Panner can do, see *The Panner parameters (p. 91)*.

Stereo OSC, Voice Limit, Density

As mentioned elsewhere, the Voice Limit parameter can show values of 1-16 whether it's being used in Single mode or Multi mode. It continues to show these values even when Stereo OSC = On, even though the polyphony has been cut in half.

WHAT THAT MEANS IS...

When Stereo OSC = On in Single mode, polyphony is capped at 8 voices, so Voice Limit values between 9-16 will still only play 8 voices. They'll be stereo voices, mind you, which is a fair trade-off.

Likewise, a Multi mode part with Stereo OSC = On has its polyphony capped at 4 voices. This means any Voice Limit value higher than 4 voices will let you trigger no more than 4 voices. You can still select values of 1-16 when editing a Multi part, but the values of 5-16 will only provide 4 voices.

For more information about those two features see *Voice Limit (p. 90)* and *Density (p. 90)*.

VOICE PARAMETERS: PAGE 4

Control knob	Parameter	Range	Description
1	Key Lock	(Chromatic octave)	Lock pad notes to a certain key. No effect if Scale = Chromatic or Micro#(x).
2	Scale	Custom + 38 presets + 32 Micro scales	See Custom Scale below; see *Scales (p. 163)* for preset scales; see *Master Settings: page 2 (p. 155)* for Microtuning operations.
3	Microtuning Scale [1]	Scale name	Visible when a microtuning scale is selected. See *Master Settings: page 2 (p. 155)* for Microtuning functions.

4	Scale Edit [2]	(access)	Enter Scale Edit page (visible when Scale = Custom)
5	Sustain Pedal	Sustain, Sosten, Mod Only	Select sustain pedal function for the patch
7	VoiceMod Edit	(access)	Enter VoiceMod Edit page
8	Snap	Off, On	Quicker attack, for sharp initial transients

[1] Only visible when Scale = one of the Micro# scales. [2] Only visible when Scale = Custom.

Key Lock

The Key Lock parameter works with the preset scales to specify which notes the pads are allowed to play. It only applies to preset scales (not Custom, Chromatic, or Microtuning).

Select a Scale

There are 38 preset scales and 32 microtuning scales available. If you don't find the one you want, you can create a custom 12-tone scale inside the Leviasynth or import new microtuning scales.

When a non-chromatic scale is selected, notes that are not in the scale are filtered out. So if you play notes outside of the selected scale, they will be quantized to the pre-determined scale notes. This also affects the incoming MIDI notes.

However, outgoing MIDI notes are not affected; if C#3 is not in the scale and you play C#3 on a pad, a C#3 will be transmitted over MIDI and USB.

For a list of the scales and the notes they contain, see *Scales (p. 163)*. For information about working with microtuning scales, see *Master Settings: page 2 (p. 155)*.

Custom Scale

The Custom scale option is located at the bottom of the scale list. To get there from Voice page 4, turn Control knob 2 fully counter-clockwise.

SCALE EDIT

After the Custom scale is selected, press Soft button 4 to enter the Scale Edit page. Here's what you'll see:

- Soft button 1: This is the first note in the custom scale, and it is based upon the Key Lock setting. The Control knob is disabled.
- Control knobs 2-8: These represent notes 2-8 of the custom scale.

QUICK ASSIGN

To assign notes quickly to the custom scale, hold Soft button 1 and play the desired notes on the pads. The existing notes will be cleared as soon as you play the first note.

Note that if the root note is entered it will be ignored (it's the Key). It's okay to enter the notes out of order; they'll be placed in chromatic order when Soft button 1 is released.

CLEAR A NOTE

To clear one or more notes, hold [INIT] and press the corresponding Soft button(s). You can't clear the Key selection on Soft button 1; that's the root key of the scale. To change it, exit this page and adjust the Key Lock parameter.

INDIVIDUAL NOTE ASSIGN

If you entered a wrong note, hold the related Soft button and play the correct note. The Control knob also can be used to select the note. Again, it's okay if the new note is not in chromatic order; this will be corrected after pressing [EXIT].

Microtonality

Microtonal scales open up a new world of musical expression beyond the 12 tones most prevalent in the music of Western culture. Now you can compose and perform music from any culture or harmonic discipline.

There are 32 memories for loading custom scales. Leviasynth includes 32 scales provided by various artists from around the world, but any of these can be replaced. You can create your own scales using a freeware application such as Scala, for example, as well as download new scales from the *www.AshunSoundMachines.com* web page.

SELECTING A MICROTUNING SCALE

To select a microtuning scale, navigate to the Scale options on page 4 of the [VOICE] menu and use Control knob 2 to scroll through the list of scales. The 32 microtuning scales show up at the end of the list. The name of the selected microtuning scale is shown in display field 3.

For more information about working with microtuning scales, see *Master Settings: page 2 (p. 155)*.

Sustain Pedal options

The sustain pedal has three options per patch: Sustain, Sostenuto, and Mod Only.

SOSTENUTO

Most grand pianos have a middle "sostenuto" pedal which can sustain a note or chord without sustaining the other notes. As long as that pedal is held down, whenever the selected notes are played they will sustain while all of the other notes play normally.

Leviasynth can do this too! This makes it possible to sustain one or more bass notes while changing the upper chords, for example, or to play a bass line under a sustained chord, etc.

Let's try it! Starting in Single mode, access [VOICE] page 4 and use Control knob 5 to select Sustain Pedal = Sostenuto. Then:

1. Hold the note or chord you want to sustain.
2. Press the pedal and release the notes. The selected notes continue to sustain.
3. Still holding the pedal, play other notes: only the pre-selected notes sustain, and the others don't.

As long as the pedal is held the pre-selected notes are sustained and their voices cannot be stolen by another note. For example, if you use sostenuto in Single mode to hold 16 notes and then try to play another note, the new note does not play. The sostenuto voices are not released until you lift the pedal, after which those voices are available again.

Note: The sustain pedal always sends MIDI CC #64. It does not send MIDI CC #66 when Sustain Pedal = Sostenuto.

MOD ONLY

It is also possible to use the sustain pedal as a mod source without sustaining a patch. Here's an example:

1. Starting in Single mode, press [INIT] twice to start from ground zero.
2. Press [OSC 1] and select Waveform = Saw.
3. Turn the Analog Filter Cutoff all the way down.
4. Press [MOD MATRIX] and then Soft button 2 to select the first mod route source.
5. Hold [SHIFT] and turn Control knob 2 until Exp Pedal is selected.
6. Release [SHIFT] and turn Control knob 2 clockwise to select Sustain Pedal as the source.
7. Press inside the Destination field and turn the Analog Filter Cutoff knob to set the Destination.
8. Turn Control knob 6 to a positive value of 30 or higher.
9. Play a note, press the pedal, and release the note. The filter opens and the note sustains.
10. Release the pedal, press [EXIT], and then press [VOICE] 4 times to access page 4.
11. Use Control knob 5 to select "Mod Only" for the Sustain Pedal parameter.
12. Repeat step 9. The filter opens but the note does not sustain.

The possibilities are endless: The pedal can control an LFO, an oscillator ratio, an effect time or level, etc., without sustaining a note.

It's always possible to use the Sostenuto or Mod Only settings with the pedal, and then sustain all of the notes by holding [SHIFT] and pressing [ARP LATCH].

VoiceMod Edit

The VoiceMod Edit menu lets you dial in a certain amount of deviation per voice, per patch. This enables Leviasynth to exhibit varying levels of instability like your favorite analog synths of the past. The good news is that it only shows up when you want it!

The fun starts in the VoiceMod menu, where you can define a per-voice offset to be applied via the Mod Matrix to any destination. Use it to set each voice's filter cutoff to slightly different values, for example, or to apply radically different Ratio values to each voice. Note: To hear this, be sure to map a VoiceMod source to at least one mod destination in the Mod Matrix.

In this section we'll describe how to access and change the per-voice offset values; in the next we'll explain how to route them to a destination. Starting in Single mode:

- Press [VOICE], then hold [SHIFT] and press the Page Down arrow to access page 4.
- Press Soft button 7 to enter the VoiceMod menu.
- Use Control knobs 1-8 to set a positive or negative value for Voices 1-8.
- Press Page Down to reach the second page of VoiceMod settings. Note that there is only one page in Multi mode.
- Use Control knobs 1-8 to set a positive or negative value for Voices 9-16.

The [INIT] and [RANDOM] buttons can be used to reset or randomize each value; hold one of those and press the Soft button for the desired voice.

PER-VOICE OFFSET EXAMPLES

To use the VoiceMod feature you need to set up a mod route using one of these sources in the Mod Matrix: Voice Mod (bipolar) or Voice Mod + (unipolar). They are found in the Source list between Velocity On and Mod Wheel.

Let's try two examples, which you can use as a framework for further explorations. Results can range from subtle to schizophrenic, if you like!

PER-VOICE OFFSET: TUNING

- Press [INIT] twice, then press [VOICE].
- On page 1 set Polyphony to Poly Rotate.
- On Voice page 4, use Soft button 7 to enter the VoiceMod Edit menu.
- Select values that are multiples of 10 on pages 1 and 2.
- Hold [VOICE] and press [OSC 1] to set up a mod route.
- Use Control knob 2 to select Pitch as the Osc 1 destination.
- Set a mod depth of 128 using Control knob 6.
- Play the same note repeatedly. It plays a melody!

PER-VOICE OFFSET: WAVEFORMS

The VoiceMod feature can even be used to make each voice play a different waveform!

1. Press [INIT] twice, then press [VOICE].
2. On Voice page 4, use Soft button 7 to enter the VoiceMod Edit menu.
3. Set each voice to a different value. Do this on page 2 for voices 9-16 also.
4. Hold [VOICE] and press [OSC 1] to set up a mod route.
5. Change the destination to Wave with Control knob 2.
6. Use Control knob 6 to set a mod depth of 128.
7. Play some notes. Each one plays a different waveform!

In the example above there are two ways to achieve zero modulation for a voice when setting up a mod route. When the mod source = VoiceMod, set the VoiceMod Edit value to 0 or any negative number for that voice. If the source = VoiceMod+, use a VoiceMod Edit value of -128 instead.

SNAP

The Snap parameter shortens or lengthens the attack time of the Amplifier to allow for sharper initial transients.

- When Snap = Off the response time of the Amplifier adopts that of the built-in Analog VCA (voltage controlled amplifier), which has the overall effect of rounding the transients a bit.
- When Snap = On the attack time is shortened so as to be nearly instant through the use of a DCA (digitally controlled amplifier). This gives bass and percussive patches more punch.

PANNER MAPS

Viewing the table below, keep this in mind: Pan positions are not tied to specific voices. The numbers are stereo positions, not voice numbers. Which position a voice occupies in the stereo field depends on two settings: *Polyphony settings (p. 89)* determine which voice is triggered when a pad is played; the *Panner (p. 91)* and *Panner Mode (p. 91)* settings determine which stereo position is selected for that voice at that time. The potential number of combinations is almost limitless.

[LEFT CENTER RIGHT]

Alter Loop:

9	7	11	5	13	3	15	1	16	2	14	4	12	6	10	8

Alter LoopMir:

8	10	6	12	4	14	2	16	1	15	3	13	5	11	7	9

Alter:

15	13	11	9	7	5	3	1	2	4	6	8	10	12	14	16

Alter Mir:

16	14	12	10	8	6	4	2	1	3	5	7	9	11	13	15

Alter Rev:

2	4	6	8	10	12	14	16	15	13	11	9	7	5	3	1

Alter RevMir:

1	3	5	7	9	11	13	15	16	14	12	10	8	6	4	2

Rotate Loop:

1	16	2	15	3	14	4	13	5	12	6	11	7	10	8	9

Rotate LoopMir:

9	8	10	7	11	6	12	5	13	4	14	3	15	2	16	1

Rotate:

9	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8

Rotate Mir:

8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9

Sides:

8	7	6	5	4	3	2	1	9	10	11	12	13	14	15	16

Sides Mir:

16	15	14	13	12	11	10	9	1	2	3	4	5	6	7	8

Sides Rev:

9	10	11	12	13	14	15	16	8	7	6	5	4	3	2	1

Sides RevMir:

1	2	3	4	5	6	7	8	16	15	14	13	12	11	10	9

Random:

_____RANDOM_____/

Mod Only:

	ALL	

It bears repeating: The numbers above represent *positions*, not voices.

THE ARPEGGIATOR SECTION

A well-designed arpeggiator can make someone who's new to music sound like a pro. Add a bit of music theory and some sound design chops to the mix and the results can be amazing. The presets make an ironclad case for that.

An overview of the Leviasynth arpeggiator features was provided in *Arpeggiator basics (p. 15)*. Information about using the arpeggiator in Multi mode is found in *Multi mode & the Arpeggiator (p. 136)*. The main focus of this chapter is to describe the arpeggiator parameters and how to use them.

ARP EDIT MODE

To enter Arp Edit mode, hold the [SHIFT] button and press [ARP ON] in the Arpeggiator & Sequencer (ARP & SEQ) section. The display will reveal the first page of Arp Edit mode parameters. Use the Page Down arrow to access parameter pages 2 and 3.

The center of the display has a row of dots called the Voice Indicators. They show which voices are being triggered by the arpeggiator. The Voice module's *Polyphony settings (p. 89)* affect which notes are being triggered.

Note: We will use the terms "Arp" and "arpeggiator" interchangeably.

Arp parameters: page 1

Control	Parameter	Range
1	Division	64', 32', 24', 16', 12', 8', 1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/1T, 1/2T, 1/4T, 1/8T, 1/16T, 1/32T
2	Octave Mode	Up, Dn, UpDn, Alt, Alt2, Random
3	Octave Range	1-6 octaves
4	Gate	5% - 150%
5	Mode	Up, Down, Up/Dn, Up&Dn, Order, RandOnce, Random, Chord, Phrase
6	Length	Default, 1-32
7	Phrase [1]	Preset 1-64, User 1-64
8	Tempo	30.0 - 240.0 BPM

[1] The Phrase parameter is only visible when Mode = Phrase.

DIVISION

Control knob 1 selects the basic time division of the arpeggiator relative to the tempo. There are 18 settings. The Triplet options are at the end of the list.

OCTAVE MODE

This parameter works together with the Octave setting, which must be >1 or you may not hear a difference. Use Control knob 2 to select the options. The descriptions are based on an Octave setting of 2 except as noted:

- **Up** plays the notes in the original octave and then repeats the pattern an octave higher.
- **Dn** (down) plays the notes in the original octave and then repeats the pattern an octave lower.
- **UpDn** (Octave = 3) plays the notes in the original octave, repeats them in the next 2 octaves, repeats them in the middle octave, and starts over.
- **Alt** plays the notes in the original octave, repeats them in the next octave, and then reverses the entire pattern. The top and bottom notes are repeated.
- **Alt 2** is identical to Alt except the top and bottom notes are not repeated.
- **Random** plays the notes from the Arp pattern in random octaves, within the Octave setting range.

OCTAVE

Use Control knob 3 to set the range of the arpeggiator. Minimum range is 1 octave; maximum range is 6 octaves.

GATE

Use Control knob 4 to adjust the relative duration of the arpeggiator notes. The full range of the parameter is 5% to 150%. A value of 100% extends the duration of each note to match the Division value; settings from 101% to 150% cause the notes in the Arp to overlap.

If you hold a note or a chord when Arp Gate time is >100% and Octave Range = 1, the Arp won't retrigger the same note(s). There's a hidden gem here: Using those settings, press [ARP ON] and [ARP LATCH], hold a chord, release the keys, and then adjust the Gate time below and above 100%. You can have the Arp hold a chord, bring it in at rhythmic intervals, and increase / decrease the Gate time again, etc. This gives the Arp even more of an improvisational nature.

MODE

Use Control knob 3 to specify the direction of the arpeggio and other behaviors. For the following descriptions we'll use a 3-note chord with Octave Mode = Up and Range = 2.

- **Up** plays the notes from low to high in each octave and repeats from the bottom.
- **Down** plays the notes from high to low in each octave and starts again from the top note of the low octave.
- **Up / Dn** plays the notes forward/backward in each octave and starts again from the bottom. The top and bottom notes are repeated in each octave.
- **Up & Dn** is identical to Up / Dn except the top and bottom notes are not repeated in each octave.
- **Order** plays the notes in the same order you did, repeats them in the next octave, and starts again from the bottom.
- **RandOnce** makes a random pattern when the notes are held, keeps that pattern until you add / remove a note, and then makes a new pattern, etc.
- **Random** plays the notes in a random order in each octave.
- **Chord** plays all held notes at one time in the first octave and then plays them again in the second octave.
- **Phrase** provides musical phrases that repeat in each octave. There are 64 preset phrases (see *The Phrases (p. 165)*), and you can make your own (see *Arp parameters: page 3 (p. 103)*. Phrase selection is done on Arp Edit page 2.

Tip: To make an arpeggio play the notes in order all the way up and down, use Octave Mode = Alt 2 and Mode = Up.

LENGTH

This parameter specifies the number of notes that will be part of the arpeggio before the pattern repeats itself. When Mode = Phrase the Length setting determines how many steps of the Phrase are allowed to play.

We'll give a couple of examples, but you'll want to try different settings to understand the way this parameter interacts with the other settings. For these examples use Mode = Up, Oct Mode = Up, and Range = 2.

- With Length = 3, hold a 4-note chord. The arpeggiator will only play the first 3 notes in the chord. To hear all four, set Length to 4. They will only play in the first octave.
- Increase Length to 5. The lowest note of the chord will appear in the second octave.
- Increase Length to 6, then 7, then 8. Gradually each note of the chord will appear in the second octave.
- Increase Length to 9. The lowest note of the chord will be repeated in the first octave and the pattern will repeat.
- Increase Range to 3. The lowest note of the chord will appear in the third octave instead of the first octave.

When Length = Default the arpeggios play their full length based on the various settings and the number of held notes.

PHRASE

This parameter is only visible when the Mode = Phrase. Options include Preset phrases 1-64 and User phrases 1-64.

To learn how to create your own Arp phrases, see *Arp parameters: page 3 (p. 103)*. For transcriptions of the Preset phrases, see *The Phrases (p. 165)*.

TEMPO

Use Control knob 8 to adjust the tempo. Hold [SHIFT] while turning Control knob 8 to fine-tune the tempo.

If Clock Sync is set to an active external source, the letters EXT will be shown instead of the tempo. This setting is found on *MIDI Parameters: page 1 (p. 150)*.

Arp parameters: page 2

Control	Parameter	Range
1	Entropy Shuff	Off, V1.01-1.20, V2.01-2.20 ... V4.01-4.20 V5.01-5.05, V6.01-6.05...V8.01-8.05
2	Swing	25-75%
3	Ratchet	0-127
4	Chance	0-100%
5	Tap Rhythm	Off, On
6	Clock Lock	Off, On
8	Step Offset	-64 to 64

ENTROPY SHUFFLE

You may have never encountered a parameter like this in an arpeggiator, or anywhere else. Stated simply, what Entropy Shuffle does is control the probability of 4 data variations being applied to the Arp pattern. The details are a bit more complex.

You can set the value on this page with Control knob 3. This does more than alter probability; it also selects new variations, and combinations thereof, as the raw material for the Entropy process. We'll define those terms in this section, but the best way to understand them is to try it yourself. The results also depend on the other Arp settings and the notes being held.

Note: Whenever Entropy is set to something other than Off, the ARP pattern duration is doubled. This gives Entropy room to do its work. The Length parameter does not change; this is an internal calculation.

We'll give an example later. For now, consider the following table.

Entropy Value	Effect
Off	No influence.
V1.01-1.20	Selects a probability range of 5-100% that Variation 1 will act upon each inserted step.
V2.01-2.20	Selects a probability range of 5-100% that Variation 2 will act upon each inserted step.
V3.01-3.20	Selects a probability range of 5-100% that Variation 3 will act upon each inserted step.
V4.01-4.20	Selects a probability range of 5-100% that Variation 4 will act upon each inserted step.
V5.01-5.05	Selects a probability range of 20-100% that Variation 1 or 2 (50-50%) will act upon each inserted step.
V6.01-6.05	Selects a probability range of 20-100% that Variation 1 or 3 (50-50%) will act upon each inserted step.
V7.01-7.05	Selects a probability range of 20-100% that Variation 2 or 3 (50-50%) will act upon each inserted step.
V8.01-8.05	Selects a probability range of 20-100% that Variations 1 to 4 (25-25-25-25%) will act upon each inserted step.

The information above can be viewed as two sets of 4 options:

- Values x.01-x.20 adjust the probability of individual variations in increments of 5% each.
- Values x.01-x.05 adjust the probability of combined variations in increments of 20% each.

Let's combine that knowledge with basic descriptions of the Variations.

Variation 1 The pattern is doubled, and each beat of the pattern gains the potential for a clone of itself, transposed up an octave, that might be generated according to the probability value. Unlike *Ratchet (p. 102)*, the beat is not subdivided.

As you try different settings, note that Entropy is based on the beat of the pattern, not the Division; the results differ with Division values of 1/4, 1/16, etc. For example, with a value of 1/8 you could hear 2 notes of the pattern duplicated up an octave (because one beat = one 1/4 note, or two 1/8th notes, etc.). With a value of 1/4 you could hear single notes in the higher octave.

Variation 2 Similar to Variation 1, but the series of all inserted (even) beats are in reversed order.

Variation 3 Similar to Variation 1, but each of the inserted (even) beats are further split in half. Any note that extends across the split point will become new note(s) at the beginning of the second half beat. First half beats are transposed up an octave, while the second half beats remain unchanged.

Variation 4 Similar to Variation 3, but the series of all inserted (even) beats are in reversed order (as with Variation 2).

Now that we've laid the groundwork, let's build some Entropy!

1. In Single mode, press [INIT] twice.
2. Hold [SHIFT] and press [ARP ON] to enter Arp Edit mode.
3. Use Control knob 1 to select a Division of 1/8.
4. Use the Page Down arrow to select page 2. Note that Entropy Shuffle value = Off.
5. Press [ARP ON] to start the Arp. You can press [ARP LATCH] if you like.

6. Hold Pads 1, 5, 8, and 12 (C-E-G-B, respectively)

   The Arp outlines a C major 7 chord.

7. Use the Entropy encoder and try values of V1.01, then V1.02, then V1.03.

   The Arp pattern is sometimes punctuated with notes an octave higher.

8. Try Entropy values of V2.10, V3.10, and V4.10, and listen.

   The variations are similar to step 7, but the notes appear in a different order.

9. When you're ready, try Entropy values of V5.01-5.05, V6.01-6.05, V7.01-7.05, and V8.01-8.05.

   Mixed variations are used in each range, with their likelihood set by intermediate values.

Those are the general concepts. But you might discover new ways to understand it through your own experiments. Try combinations of Division, Octave Mode / Range, Modes, Ratchet and Chance, notes in different octaves, chords, etc. Between your creativity and the tools Leviasynth provides, you'll soon be making music that was previously unimaginable.

SWING

The Swing feature is a well-known rhythmic effect that applies an increasing amount of "shuffle" to a beat. While most products offer a range of 50-75%, the Leviasynth arpeggiator lets you adjust the Swing between 25% and 75%. Use Control knob 2 to select a value. You can also hold [SHIFT] while turning for precise adjustments.

RATCHET

This specifies how many subdivisions of an arpeggiator step are possible (1, 2, 4, or 8). But you'll notice there are 128 values for this parameter, not four. The table below helps illustrate how it works.

Note: Ratchet needs the Chance parameter to be above 0 before it can be heard.

Ratchet value	x1	x2	x4	x8
0	100%			
32	50%	50%		
64		50%	50%	
127		33%	33%	33%

As the Ratchet value increases, the balance shifts between each row. For example, if Chance = 100%, a Ratchet value of 32 gives the note a 50% chance of being subdivided once (i.e., by a 2x ratchet event). Ratchet values below 32 lower that percentage; values above 32 increase that percentage and also introduce the possibility of a 4x ratchet event, etc.

If you're using CV / Gate connections, it's important to know that a Ratchet event is sent to the Gate output, but does not affect the clock output.

Note that Ratchet and Tap Rhythm work together: Ratchet events are still generated but are triggered manually.

CHANCE

This determines the likelihood of a Ratchet event happening on a given arpeggiator step. Its values range from 0% (no chance) to 100% (highly likely on every step).

TAP RHYTHM

When Tap Rhythm is enabled the arpeggiator triggers a note every time [TAP TEMPO] is pressed. This lets you walk through the pattern one note or chord at a time, depending on the Mode and other settings. (The [TAP TEMPO] button is on the SEQ EDIT page; see *Tap Tempo / Metronome (p. 107)*).

Note that Tap Rhythm sends signals only to the Gate output. The Clock out still runs at the selected clock rate.

CLOCK LOCK

This locks the arpeggiator phase to the system clock so it will sync to other clocked elements such as an LFO with BPM Sync set to On.

Here's something else you might notice:

- With ClkLock set to Off and the Leviasynth as the master clock source, the arpeggio starts when the first note is played.
- With ClkLock set to On, the arpeggio starts at the next quantized value *after* the first note is played. In this case you might experience a slight delay between triggering a note and the onset of the arpeggio.

Tip: When synced to an external clock:

- Clock Lock On should be used when playing manually
- Clock Lock Off is best when notes are triggered from an external source (e.g., during playback from a DAW)

STEP OFFSET

This parameter can offset an Arp pattern by up to 64 steps, forward or backward. It can be used with standard arpeggios or phrases.

Let's see how the Offset parameter affects a simple 3-note chord:

1. Press [INIT] twice to initialize the patch.
2. Hold [SHIFT] and press [ARP ON] to enter Arp Edit mode.

3. Set Division to 1/4 and Octave Range to 2.
4. Hold 3 notes and press [ARP ON] to start the Arp. It plays notes 1, 2, 3, and repeats.
5. Press [ARP ON] to stop the Arp, and press the Page Down arrow to access page 2.
6. Set Step Offset to 1 and hold the same 3 notes.
7. Start the Arp. It plays notes 2 and 3, and then repeats notes 1-3.
8. Repeat steps 5-7, but set Step Offset to 2 this time.
9. The Arp starts with note 3, and then repeats notes 1-3.

When 3 notes are being held a Step Offset value of 3 sounds the same as an offset of 0, 6, or 9 (and all other multiples of 3). But when 4 notes are held a Step Offset of 3 starts with note 4, and then repeats notes 1-4. In that case, all Step Offset values that are multiples of 4 sound the same.

In the next example you'll see how the Offset works within the boundaries of the Length parameter. Starting with an Init patch:

1. On Arp Edit page 1, use Control knob 5 to set Mode to Phrase.
2. Use Control knob 6 to set Length to 16 steps.
3. Use Control knob 7 to select phrase P14, which has 32 steps.
4. Play a note. You'll hear the Arp phrase play steps 1-16 and repeat.
5. Use the Page Down arrow to access page 2.
6. Set the Step Offset to 8 using Control knob 8.
7. Play a note. You'll hear the Arp phrase play steps 9-16, then repeat steps 1-16 until you release the note.

In item 6 above a Step Offset value of 8 or -8 yields the same results, because each makes the phrase start at step 8 in the 16-step pattern. So either way, the phrase starts on step 9.

See *The Phrases (p. 165)* for a transcription of each phrase.

Arp parameters: page 3

Control	Parameter	Range
Button 1	Press To Replace	(action)
Knob 2	Arp Phrase	User 01-64
Knob 3	With Track	Track 1, Track 2

The parameters on this page let you create your own Arp patterns to use when Mode = Phrase. The source of the phrase material is drawn from Track 1 or Track 2 of the Sequence that is saved with the patch.

The basic idea is to record a chunk of music into one of the note data tracks, set it to the desired length, edit it to taste, and then use this page in Arp Edit mode to turn it into an Arp pattern. The track can be a single-note line, a polyphonic passage, or a mixture of notes and chords.

Before you read on, it's important to know that the Arp User Phrases are not actually part of the patches. They are held in their own memory bank, and each patch points to a specific item within that bank. So if two patches point to Arp User phrase 10, for example, and that phrase is replaced with a new phrase, both patches will be affected.

PRESS TO REPLACE

Use this button after you have selected the Arp phrase you want to replace with the note data from Track 1 or Track 2.

ARP PHRASE

Use Control knob 2 to select the target User phrase that will be replaced when Soft button 1 is pressed. If you aren't sure, return to page 1 and audition that User phrase before replacing it to confirm if it is empty, or if there is data already there that you don't want to lose. There are 64 User phrase locations available, so there's lots of room for your ideas.

WITH TRACK X

This selects which source to use when replacing the User phrase targeted in Edit field 2. You can use data from Track 1 or Track 2, the ones with note data. You can't place data from the Macro track into a User phrase.

Note: Conversely, the arpeggiator output can be recorded into a Sequencer track too. To learn more, see *Record Arp Notes to a Track (p. 120)*.

Latch and Sustain

Press [ARP LATCH] to activate Latch mode. This enables you to take your fingers off the pads and use both hands to adjust parameters. It works whether an arpeggio is running or not.

Use [SHIFT] + [ARP LATCH] to activate Sustain mode. This also works whether an arpeggio is running or not. It's the same response as using a sustain pedal.

Between these two parameters there are four potential combinations, as shown in the chart. The status of the [ARP LATCH] button LED provides a visual clue as to which settings are active.

Latch	Sustain	[ARP LATCH] LED status
On	Off	Button lit constantly
On	On	Flashing cycle: 0.8s lit, 0.2s unlit
Off	On	Flashing cycle: 0.5s lit, 0.5s unlit
Off	Off	Button dimly lit

Initialize the Arp

Hold [INIT] and press [ARP ON] to initialize the Arpeggiator module. All parameters will return to their defaults.

The Arpeggiator & MIDI

The setting of *Arp Seq TX (p. 153)* determines whether the arpeggiator and sequencer will transmit notes via MIDI / USB. The following table illustrates the basic capabilities of the Arp Seq TX settings, as they relate to the Arpeggiator.

Arp Seq TX setting	Off
MIDI / USB outputs will transmit the arpeggiator notes	No
The [ARP LATCH] button will latch outgoing MIDI notes [1]	Yes
[SHIFT] + [ARP LATCH], Sustain pedal will sustain incoming / outgoing MIDI / USB notes	Yes

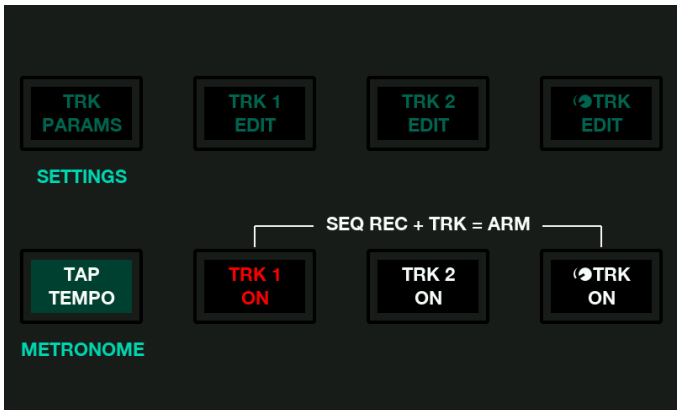
[1] [ARP LATCH] has the same effect on notes whether the arpeggiator is running or not.

SEQUENCER

The Leviasynth sequencer is designed to capture inspiration the moment it happens. Once captured, the music can be processed in many unconventional ways, all inside Leviasynth.

Unlike step sequencers that simply trigger events, Leviasynth can record your live performances - velocity, aftertouch, and even the spontaneous Macro changes that bring your music to life.

No doubt you've noticed the Sequencer Play / Record buttons under the [ARP ON] and [ARP LATCH] buttons. Those do what they say; all other sequencer functions are accessed through on-screen buttons in the display. Hold [SHIFT] and press [SEQ PLAY] to enter the SEQ EDIT page, and let's take a look at what you see.



SEQUENCER BASICS

If you want to skip the details and go straight to the recording examples, see *Real-time recording (p. 117)* and *Step record mode (p. 117)*.

Two Track Types

The sequencer has two types of tracks available, each with a different creative focus.

Note Tracks (Track 1 & Track 2) handle the melodic and harmonic content, with real-time and step-record modes. Each note track operates independently with its own length, rate, playback mode, and many other options.

The **Macro Track** contains eight automation lanes that record real-time movements of the Macro controls. The Macro Track works with relative offsets rather than absolute values, ensuring immediate musical effect regardless of current Macro positions. The Macro Track can record smooth automation or be processed with sample-and-hold and bit-reduction effects. It's also possible to enter specific values on each Step for each Macro in Macro Track Edit mode.

Real Time Record / Playback

Real-time recording captures live musical performances. The notes you play will be quantized to particular steps based on the track's Rate setting; real-time activity from the Macros and aftertouch are captured on the fly.

During playback an asterisk will flash inside the soft buttons on the Home page to indicate the presence of recorded Macro activity.

Step Recording

Step recording provides an alternative to real-time recording, allowing precise note entry without timing pressure. Access Step Record mode via SHIFT + SEQ RECORD for the note tracks. The Macro track does not allow step recording, but you can enter and edit values in Macro Track Edit mode.

Editing

Track Edit mode provides detailed control over individual steps within each track. The display lets you view different types of recorded data depending on what you want to enter or edit.

The Pads: More Than Meets the Eye

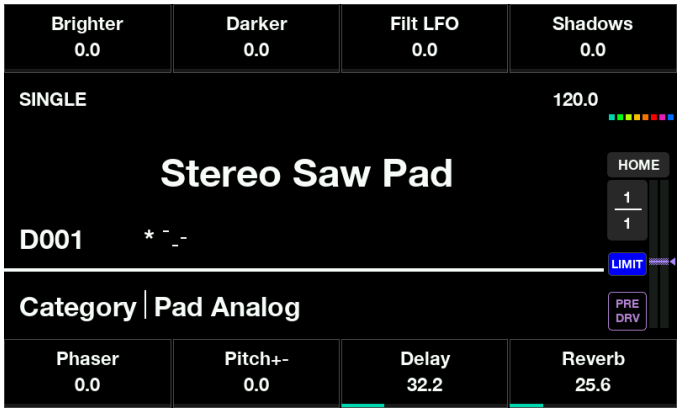
The pads are beautiful and expressive, but they can do much more than trigger notes. When you are recording or editing a track they can show you the length of the track, which steps contain data, and which steps are muted.

It's easy to switch the pads between Play Mode and Step SEQ mode: Simply press the [PAD MODE] button on the left side of the top panel. We'll go through specific examples on how to use the Step SEQ mode in the pages ahead.

For an overview of everything the pads can do in Play Mode, see *Using the Pads (p. 30)*.

Home Page SEQ Alert

The Home page shows small bars near the patch number after a track has been recorded or edited.



It does *not* show these bars if a newly selected patch happens to contain SEQ data, so you might want to check Track Edit to see if a track contains data before you record.

INTEGRATED PHYSICAL + VIRTUAL CONTROLS

Between the SEQ Rec, SEQ Play, and onscreen Track buttons, you have everything you need to record and edit your tracks. It won't be long before the relationship between the physical and virtual buttons becomes a seamless, interactive environment where your creativity can thrive.

Terminology

Before we talk about what the buttons do, let's be clear about the terms we will use.

- Sequencer is sometimes called "SEQ", just as Arpeggiator is sometimes called "Arp."
- [SEQ RECORD], [SEQ REC], and "Record button" refer to the one with a red circle below the red letters.
- [SEQ PLAY], [PLAY], and "Play button" refer to the one with a white triangle below the white letters.
- To "arm a track" means to put it into record-ready status. When a track is ready to record, it is "armed".

Transport Controls

The Arp & SEQ section has two Transport controls dedicated to the sequencer: [SEQ REC] and [SEQ PLAY]. Small in number, but mighty in function: They are used to arm tracks, to initiate a recording, and to play back the sequence. They are also used with the [SHIFT] button to enter Step Recording mode and to access the SEQ Edit page.

SEQ REC / STEP RECORD

The status of the [SEQ REC] LED tells you at a glance what will happen when you press [PLAY]:

- When [SEQ REC] is dim, pressing [PLAY] begins playback, not real-time recording.
- When [SEQ REC] is bright, pressing [PLAY] will activate real-time recording for the armed track.
- When [SEQ REC] is flashing, the armed track is in Step Record mode and waiting for input. You can enter notes or rests one step at a time using a combination of the pads and the soft buttons. Note: If you press [PLAY] the sequencer will exit Step Record mode and start playback of the sequence.

SEQ PLAY / SEQ EDIT

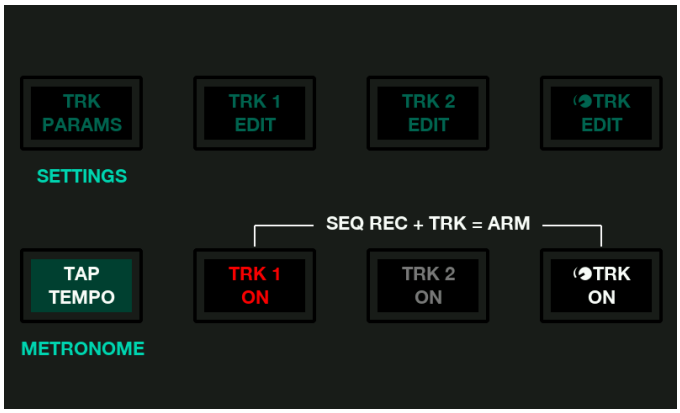
[SEQ PLAY] starts and stops playback when a record mode is not active. When playback starts, all tracks start from the beginning and all LFOs are reset (depending on SEQ Settings). When playback stops, the current cursor positions for each track are maintained and are visible in Track Edit mode.

Note that a track might not start with step 1, depending on its settings for Mode and Step Offset. More about that in a bit.

Onscreen Track Buttons

Hold [SHIFT] and press [SEQ Play] to access the SEQ Edit page. Here you'll find the buttons that let you edit, mute, and arm specific tracks for recording. It's also home to the Track Parameters and Sequence Settings, as well as the [TAP TEMPO] button and the Metronome.

Here's an example of what you might see. We'll explain the status of the buttons in the next few sections.



TRK 1/2/MACRO EDIT

These buttons are on the top row of the display. Use them to access Track Edit mode for each of those tracks. To learn how to edit each type of track, see *Track Edit (p. 113)* and *Macro Track Edit mode (p. 116)*.

TRK 1/2/MACRO ON

These buttons are on the bottom row of the display. Use them to toggle the track status between active and muted. Hold [SEQ REC] and press one of these buttons to arm those tracks. See *Arm / Record Tracks (p. 107)* for specific information.

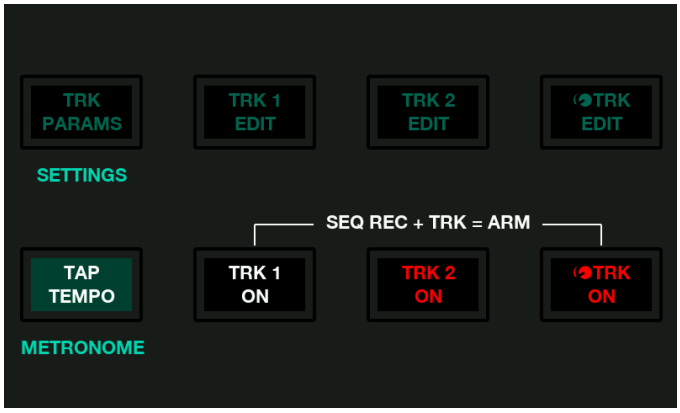
Play / Mute Tracks

Take another look at the previous screen shot. You'll notice that the Track 2 On button is not as brightly lit as the Macro Track On button on the right. When a track button LED is dim, it means that track is muted. When it is bright, it is active. You can tap any Track On button to toggle its status, even one that is armed for recording (i.e., red).

Performance note: Tracks can be muted and unmuted without stopping the sequence. When a track is muted its notes end according to their gate time settings rather than cutting off abruptly.

Arm / Record Tracks

Arming a track enables it to capture events while recording. To arm a track, hold [SEQ REC] and the tap desired track On button.



REAL TIME

Track 1 and Track 2 are exclusive; you can't record to both tracks at the same time. The Macro Track can be armed independently, so it's possible to record to one of the note tracks and the Macro track simultaneously.

To arm a track, hold [SEQ REC] and the desired track. If [TRK 2 ON] and [MACRO TRACK ON] are lit red, as in the screen shot above, both are armed for recording.

What happens next depends on whether the [SEQ REC] button is bright or dim. If it's bright, when you push [PLAY] recording will begin (after the count-in, if the Metronome is active). If [SEQ REC] is dim, recording does not begin when [PLAY] is pushed.

For more information and an example of how to record tracks, see *Real-time recording (p. 117)*.

STEP RECORD

Step record mode is only available for the note tracks (Tracks 1 and 2). First arm the desired track by holding [SHIFT] + pressing one of the Track On buttons, then hold [SHIFT] and press [SEQ REC] to enter Step Record mode for that track.

The Macro Track does not support step recording - it can only record in real-time. But in *Macro Track Edit mode (p. 116)* you can enter and edit Macro values for each step of the Macro track, for any one of the 8 Macros.

There's more information and some step-by-step examples in *Step record mode (p. 117)*.

Tap Tempo / Metronome

[TAP TEMPO] lets you adjust the tempo manually by tapping the button in rhythm. [SHIFT] + [TAP TEMPO] toggles the metronome on and off.

If you want to set the tempo to a specific value, that's done on *SEQ Settings: Page 1 (per sequence) (p. 111)*.

You can specify whether the metronome is only active while recording or is also active during playback. This choice is made on *SEQ Settings: Page 2 (Global) (p. 112)*.

Track Params / SEQ Settings

Each track type has specific pages of parameters and settings which you can access via the [TRK PARAMS] button. These can be different for every patch.

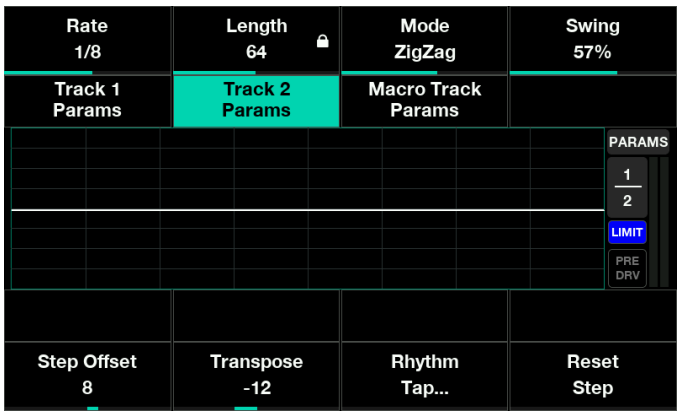
Note the word SETTINGS under the onscreen [TRK PARAMS] button. This means you can access the SEQ Settings by holding [SHIFT] and pressing [TRK PARAMS]. There are settings here that apply to all 3 tracks and are saved with the patch, and there are global settings that apply to all Leviasynth sequences equally.

ACCESS TRACK PARAMETERS & SETTINGS

Press [TRK PARAMS] to access the track parameters and settings. Since there are two track types, their pages have different contents. Different methods are used to view the pages:

- Note tracks: Pressing [Track 1 Params] repeatedly cycles between page 1 (parameters) and page 2 (settings) for Track 1. The same happens for Track 2 when you press [Track 2 Params] repeatedly.
- Macro track: It takes three presses of [Macro Track Params] to cycle through the pages: Pages 1 and 2 (parameters) and page 3 (settings). You can also hold [SHIFT] + press the Page Up / Down arrows to jump between pages 1 and 3.

The display contents are different from other Leviasynth pages, too: There is an inner row of soft buttons that are used to select the tracks.



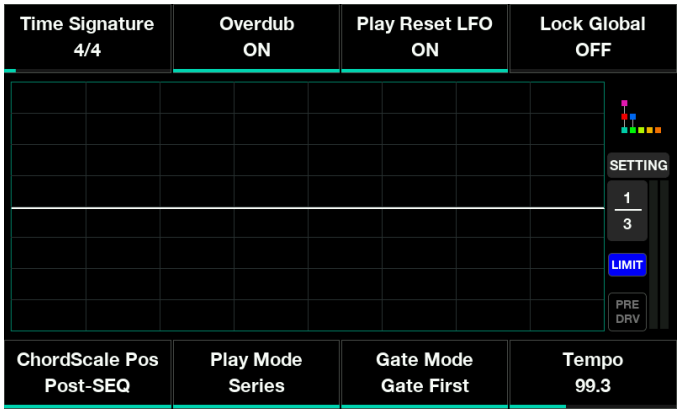
The same layout shows up again when we start editing tracks and using the Step recording features.

ACCESS SEQUENCE SETTINGS

From the SEQ Edit page, hold [SHIFT] + press [TRK PARAMS] to access the Sequence Settings (aka SEQ Settings).

There are 3 pages here. You can hold [SHIFT] + press the Page Up / Down arrows to jump between pages 1 and 3.

Note that there's no inner row of buttons for the SEQ Settings pages. That's because these settings apply to all 3 tracks equally.



WHAT'S THE DIFFERENCE?

- Track Parameters (page 1) define playback behavior per track: Rate, Length, Mode (direction), Swing %, etc. Note: The Macro track has two pages of Track Parameters.
- Track Settings, also per track, are for MIDI / CV routing, Multi mode part selection, polyphony limits, etc. Note: These are on page 2 for the note tracks; they're on page 3 for the Macro track.
- SEQ Settings has settings that apply to all 3 tracks in the current sequence (page 1) and global settings that apply to all sequences (pages 2 and 3).

See below for specific details and descriptions.

Track parameters: Tracks 1 + 2

Page 1 is very similar for the note tracks and the Macro track.

NOTE TRACKS: PAGE 1 (PARAMETERS)

Control	Parameter	Range	Description
1	Rate	64', 32', 24', 16', 12', 8', 1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/1T, 1/2T, 1/4T, 1/8T, 1/16T, 1/32T	Step duration
2	Length	1–128 Locked / unlocked [1]	Track length in number of steps. Tap soft button 2 to toggle lock status.
3	Mode	Forward / Backward / FW & BW / FW2 & BW2 / Zigzag / Random Once / Random / Random2	Playback direction and other variations
4	Swing	25–75%	Percentage of swing
5	Step Offset	-64 to 64	Offsets all step positions
6	Transpose	±4 octaves	Transposes output in semitones
7	Rhythm Tap...	(access)	Enter Rhythm Tap page
8	Reset Step	(action)	Reset current track to first step

[1] Tap the Length parameter to toggle between locked and unlocked states. When unlocked, real-time recording can extend length automatically.

Rate

This sets the rhythmic value of each step in relationship to the tempo. A value of 1/16, for example, means the step occupies a 16th note. A value of 16' means the step occupies 16 beats, or four measures. A letter T after a value means it's the triplet version of that value; i.e., 1/16T is a 16th note triplet.

Triplet and non-triplet rates can be used on different tracks for polyrhythmic sequences.

Length

This is the number of steps in the track. Hold [SHIFT] and turn Control knob 2 for non-standard lengths.

A length of 64 steps = 4 bars if Rate is set to 1/16. If Rate is set to 1/8, then 64 steps = 8 bars, and so on. When unlocked, real-time recording can extend the length automatically.

If track 1 has 64 steps but you only want it to play the first 32 steps when the patch is selected, set track length to 32 and save the patch. If you change your mind, you can set the track length to 64 steps again and the data will still be there.

Mode

The mode setting determines which steps will play back, and in which order.

Mode	Description
Forward / Backward	Linear playback in the selected direction.
FW & BW	Plays forward completely, then backward completely.
FW2 & BW2	Plays forward twice, then backward twice.
Zigzag	Plays steps in a specific order. [1]
Random Once	Shuffles the step order once, then repeats that pattern. [2]
Random	Plays steps in random order but obeys the Entropy Rule. [3]
Random2	Completely random playback of the steps in the track.

[1] If Rate = 1/8 and Length = 16, Zigzag plays steps 1-5-2-6-3-7-4-8, then 9-13-10-14-11-15-12-16.

[2] The pattern generated by Random Once can be permanently applied to the current track by holding [SHIFT] and pressing soft button 3 (Mode). This replaces the original note track data with the current random pattern and resets Mode to Forward.

[3] Random: Plays the steps in a random order while keeping track of the mute/play status defined by the Entropy Rule. Example: If the Entropy rule for step 4 is Mute1-Play1, the first time step 4 is triggered at random, it will be muted. The second time it is triggered at random, it will play. See *Entropy Rules (p. 116)* for a full list of the options.

Real-time recording overrides the track mode if it is not set to Forward. After you stop recording the original track mode will be restored (Backward, ZigZag, etc.). If playback sounds different than what you played in, set the mode to Forward temporarily and listen again.

Swing

This applies an increasing amount of "shuffle" to the relationship between the steps.

Step Offset

This parameter can offset a track by up to 64 steps, forward or backward. For example, if a track is 8 steps long and Step Offset = 4, the track will start with step 5, play through step 8, then play steps 1–4 and repeat the cycle.

Transpose

This parameter lets you transpose the track up or down four octaves in chromatic increments.

Rhythm Tap...

If you like the notes in a track but want to try a new rhythm using the same notes, this feature lets you do that.

Press soft button 7 to enter the Rhythm Tap page. There are three buttons inside:

- Tap Rhythm is used to tap the new rhythm.
- Re-tap Rhythm tells the sequencer you want to try again.
- Apply Rhythm tells the sequencer you're happy with what you did and you want it to replace the current track.

It's surprisingly easy to do this. When you enter this page and you're ready to go, press [PLAY] and the metronome will start. Then follow these steps:

1. Tap soft button 5 to enter the new rhythm you want to apply to the track.
2. When you hear the downbeat, start tapping. The first tap becomes the first step in the track.
3. This process even remembers how long you hold down the button, and will tie the notes if you hold it long enough.
4. Track length will be extended if you go beyond the original length, up to a maximum of 128 steps.
5. Press [PLAY] to hear what you did.
6. If you don't like it, press soft button 7 (Re-tap Rhythm) to start over.
7. When everything is the way you want it, press soft button 8 (Apply Rhythm), and the new rhythm will be printed to the track, exactly the way you played it.

You can press [EXIT] at any point during those steps and your original track will be preserved.

Reset Step

Pressing soft button 8 will reset only the current track back to the first step. If the sequencer is running, the other tracks will keep going. If it has stopped, the other tracks will stay at their current cursor position(s).

NOTE TRACKS: PAGE 2 (SETTINGS)

This page handles MIDI channel assignments, determines whether the track plays locally or only on external devices, and has other parameters that make sense with note data but not with Macro data (Voice polyphony, for one thing).

Control	Parameter	Range	Description
1	MIDI RX	Default, 1–16	MIDI input channel
2	MIDI TX	Default, 1–16	MIDI output channel
3	CV TX	Off, On	CV pitch & gate output
4	Local	Off / Global / Upper / Lower	Connection to internal engine
5	Voice	Mono, 2–16	Voice polyphony for the track
6	Gate Fix	Off, 5% – 100%	Fixed gate length override
8	Apply Voice Scale	(action)	Quantize all notes to voice scale

MIDI RX/TX

When set to Default, the track uses the settings on MIDI page 1. But it can be sent to a different MIDI channel instead.

CV TX

If you want the current track to transmit its note on / off messages to the CV / Gate outputs, set this parameter to On. All of the usual caveats apply; this works better with a monophonic track.

Local

This parameter determines if the selected track will play the current Leviasynth patch or an external device. If you want it to do both, set this to something other than Off and configure the MIDI and CV parameters as needed.

- **OFF**: No local sound generation, sends to MIDI and/or CV outs only.
- **Global**: Send track to the local engine exactly as it can be played on keys. This is especially useful when you want to play a Multi patch that has a crossfading split.
- **Upper/Lower**: Route the track to one or the other part in a Multi.

Voice

This sets the Polyphony limit for the selected note track.

Gate Fix

This parameter overrides the per-step Gate settings of the track. It doesn't change the track; it only unifies the gate time of the notes during playback.

Apply Voice Scale

This will apply the scale selected on page 4 of the Voice module to the notes within the track. This action is permanent, so be sure that's what you want to do before you press soft button 8.

Track parameters: Macro track

MACRO TRACK: PAGE 1 (PARAMETERS)

Control	Parameter	Range	Description
1	Rate	64', 32', 24', 16', 12', 8', 1/1, 1/2, 1/4, 1/8, 1/16, 1/32, 1/1T, 1/2T, 1/4T, 1/8T, 1/16T, 1/32T	Step time rate
2	Length	1–128 Locked / unlocked [1]	Track length in number of steps. Tap soft button 2 to toggle lock status.
3	Mode	Forward / Backward / FW & BW / FW2 & BW2 / Zigzag / Random Once / Random / Random2	Playback direction and other variations
4	Swing	25–75%	Percentage of swing
5	Step Offset	-64 to 64	Offsets step position
6	Scale	0–100%	Amount of Macro influence
8	Reset Step	(action)	Reset Macro track to first step

[1] Tap the Length parameter to toggle between locked and unlocked states. When unlocked, real-time recording can extend length automatically.

All except one of those parameters were explained in *Note tracks: Page 1 (parameters) (p. 108)*. The Scale parameter requires a bit more information.

Scale

This provides an easy way for you to adjust the amount of impact the automation has on the Macros. 0% means no influence at all; 100% means maximum impact.

MACRO TRACK: PAGE 2 (PARAMETERS)

Control	Parameter	Range	Description
5	S&H	Off, 32–1	Creates rhythmic effects by sampling Macro track output at regular intervals.
6	Bit Redux	Off, 24, 16, 8, 4, 2	Reduces Macro track resolution for digital stepping effects.

S&H (Sample & Hold)

This represents the number of samples taken and held within a step. The time between samples is evenly split within the step: Off passes all values as they happened; a value of 32 means that many samples were taken inside the step, and 1 means 1 sample per step. This can produce some interesting rhythmic modulations. Note that it only affects the automation output; it does not change the recorded automation.

Bit Redux

This reduces the Macro track resolution so there are fewer levels of modulation: Off = full resolution; a Bit Redux value of 8, for example, only allows 8 modulation levels between 0 and 128. Note that this only affects the automation output; it does not change the recorded automation.

MACRO TRACK: PAGE 3 (SETTINGS)

This page handles MIDI channel assignments for the Macro track output, and determines whether the data is interpreted locally or is sent only to external MIDI devices.

Control	Parameter	Range	Description
1	MIDI RX	Default, 1–16	MIDI input channel
2	MIDI TX	Default, 1–16	MIDI output channel
4	Local	Off / Global / Upper / Lower	Connection to internal engine

See *Note tracks: Page 2 (settings) (p. 110)* for descriptions of these parameters.

SEQ Settings

If you're not already on the SEQ Edit page, hold [SHIFT] and press [PLAY]. Still holding [SHIFT], press [TRK PARAMS] to access the SEQ Settings. These pages contain parameters that pertain only to the current sequence, as well as global parameters that affect overall operation.

SEQ SETTINGS: PAGE 1 (PER SEQUENCE)

Control	Parameter	Range	Description
1	Time Signature	1/4–16/4, 1/8–16/8, 1/16–16/16	Time signature for count-in and metronome
2	Overdub	OFF / ON	Toggle for overdub during real-time recording
3	Play Reset LFO	OFF / ON	Reset LFO when SEQ PLAY is triggered
4	Lock Global [1]	OFF / ON	Lock SEQ to avoid changes when switching patches
5	ChordScale Pos	Pre-SEQ / Post-SEQ	Position of Chord Scale processing in signal flow
6	Play Mode	Parallel / Series	Play mode for tracks 1 & 2
7	Gate Mode	MultiTrig First / Gate First	Interaction between Gate and MultiTrig
8	Tempo	30.0–240.0 BPM, External	Tempo of ARP/SEQ and all BPM-based modules

[1] Lock Global is a global parameter. It is listed on the per-sequence page to make it easy to find!

Time Signature

This affects the count-in length and metronome emphasis of the downbeat. All standard signatures from 1/4 to 16/16 are available.

Overdub

Overdub lets you add notes to a track in subsequent passes when recording in real-time. When Overdub = Off, newly played notes always replace the existing contents.

Play Reset LFO

This gives you the option whether to have the LFOs reset their cycles or not when [PLAY] is pressed.

Lock Global

Another reason to use this setting is to prevent losing sequence data when browsing patches in Multi mode. When enabled, sequences are protected from patch changes.

ChordScale Position

This determines whether chord and scale processing happens before the sequencer (Pre-SEQ) or after it (Post-SEQ). This affects how these functions interact with the note tracks. This diagram may help visualize the concept:

ARP→[CHORD→SCALE]→SEQ→[CHORD→SCALE]

In the diagram above, the brackets indicate that Chord and Scale are to be considered as a unit. Depending on this setting, each sequence can have it configured one of two ways:

- Pre-SEQ: ARP → [CHORD → SCALE] → SEQ
- Post-SEQ: ARP → SEQ → [CHORD → SCALE]

Play Mode

This setting lets you configure the note tracks in one of two ways:

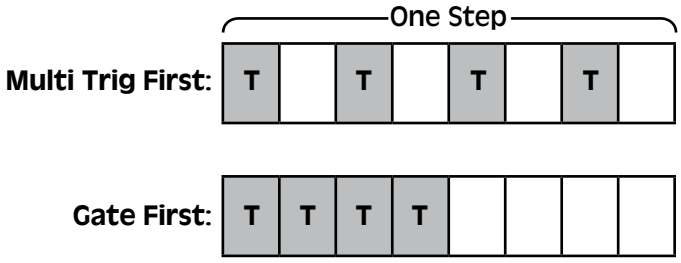
- Parallel – The note tracks play simultaneously, and can be muted / unmuted independently.
- Series – Only one note track will play at a time: Selecting track 1 mutes track 2, and vice-versa. When the new track is selected, the first finishes the step it is on, and then the selected track will start from its first step.

The Macro track always plays in Parallel to the others, so the data on that track will affect the other tracks appropriately when they are selected. It can be muted and unmuted too.

Gate Mode

This determines the interaction between the Gate and MultiTrig settings. It may be better to look at the graphic before reading the descriptions.

Gate Mode Options



In each example above, the T stands for one of the MultiTrig subdivisions, and the empty space represents the remaining time between the Gate length and the length of the step (i.e., the Rate).

What Gate Mode does is decide which has priority when dividing the step: the MultiTrig events or the Gate length. With a Gate Length of 50% and MultiTrig = 4, here's what happens:

- **MultiTrig First** – Divide the step into 4 sections, then allocate 50% of each section to a MultiTrig event.
- **Gate First** – Divide the step in half, split that half into 4 MultiTrig events, and do nothing for the last 50% of the Gate length.

In both modes, the MultiTrig events add up to 50% of the Gate Length, but they're spread out differently.

Tempo

With a range of 30-240 BPM, this sets the master clock for the arpeggiator, sequencer, and all items with BPM = On (LFOs, Delay, etc.). The display shows (EXT) when using external synchronization.

SEQ SETTINGS: PAGE 2 (GLOBAL)

Control	Parameter	Range	Description
1	REC Count-in	Off, 1–4 bars	The number of count-in bars before recording
2	REC Length Qtz	Off / On	Track length quantization during recording
4	Ext Start Stop	Off / SusPedal / Mod In 1 / Mod In 2	Determines local or external control for start/stop.
5	Metro Volume	16–128	Metronome volume
6	Metro Output	Both / Phones / Main	Metronome audio routing
7	Metro Sound	A / B / C / D / E / F / G / H / I / J / K	Metronome click sound
8	Metro Mode	Rec Only / Always On	If metronome = On, this determines when it will be active.

Some of those settings need more explanation.

REC Length Qtz (Quantize)

This enables automatic length quantization during real-time recording. The results are based on the selected rate for the track on which you are recording. Here are three examples of what this means when the track rate is set to 1/16:

1. If you stop recording at step 18 (two steps late), the sequencer will set the track length to 16 steps.
2. If you stop recording at step 14 (two steps early), the sequencer will set the track length to 16 steps.
3. If you stop recording at step 21, the sequencer will set the track length to 24 steps.

Ext Start Stop

This provides additional options for starting and stopping the sequencer, in addition to pressing [PLAY]. You can use the Sustain pedal, or set it to look for a voltage input from one of the Mod In jacks. This makes it possible for a Eurorack module to start and stop the Leviasynth sequencer.

Metronome Mode

Sometimes you want the metronome only while recording, and other times you want it during recording and playback so you can assess the accuracy of the recording. This parameter gives you those options: Record Only and Always On.

This parameter interacts with the metronome On / Off setting.

- Metronome Off, Record Only: the metronome gives a pre-record count-in, but the metronome stops after that.
- Metronome On, Record Only: the metronome gives a count-in and is present during the recording.
- Metronome Off, Always On: the metronome gives a pre-record count-in, but the metronome stops after that.
- Metronome On, Always On: the metronome gives a count-in and is present during the recording and playback.

SEQ SETTINGS: PAGE 3 (GLOBAL)

There's only one item on this page:

Control	Parameter	Range	Description
1	Auto Flip Page	OFF / ON	Automatic page following during playback

Sometimes when editing a track you want to be able to focus on a certain group of 8 steps and tweak the settings while the sequence is running. That's what the Auto Flip Page parameter does. When it's set to On, the step groups will advance during playback. When it is off, step groups will not advance, and you can use the Page Up / Down buttons to select which group of steps you want to edit during playback.

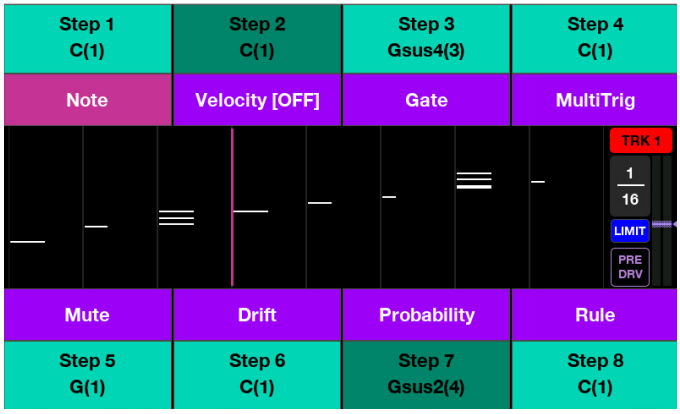
Track Edit

After a track is recorded, you can view and edit it with microscopic precision in Track Edit mode. Enter the SEQ Edit page (hold [SHIFT], press [PLAY]), then press [TRK 1 EDIT] and let's examine the basic components of this mode. It's OK if the track is empty.

- Eight steps are visible at one time. We call this a step group. Use the Page Up / Down arrows to select adjacent step groups.
- Each of the 8 steps is linked to a Control knob. Use them to edit the values.
- The inner row of soft buttons is used to select different types of data (Notes, Velocity [ON], Gate, etc.). We call them “tabs”, as in Notes tab, Drift tab, etc. For example, press soft button 6 on the inner row (the Drift tab) to view the Drift values for those 8 steps.
- During playback a vertical cursor moves through the middle of the display, so you can see which data is associated with the current step.
- When the selected track is armed, its name is highlighted in red in the Info section.
- Hold [SHIFT] + tap a step to preview that step. This also jumps the cursor for that track during playback.
- If no pads have been played since the unit powered up, when you tap an empty step it enters a C with default values.
- There are more track editing tips listed in *Tricks & Techniques (p. 116)*.

Now let's look at some examples of what you might see.

NOTE TAB

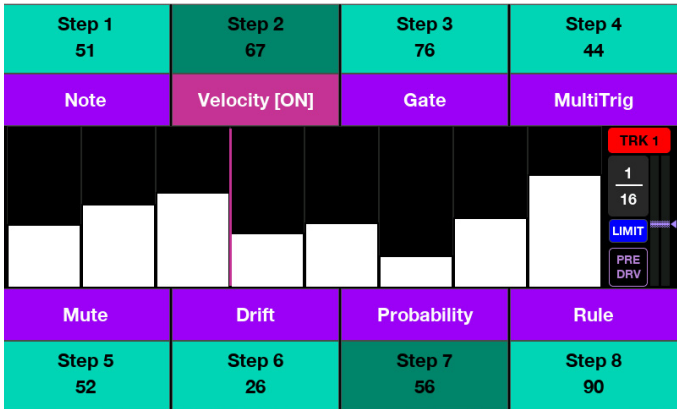


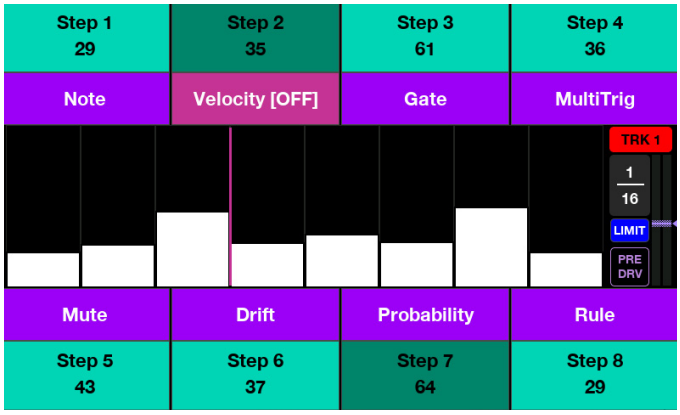
With the Note tab selected the outer soft buttons show the names of the notes or chords that occupy each step. The numbers in parentheses show the polyphony used by that step. If you turn the associated Control knob it will transpose the note or chords in that step.

In this screenshot steps 2 and 7 are muted, so their fields are darker than the others. If the Pad Mode = STEP SEQ, the pads corresponding to the muted steps are also dim compared to the others. The data is there, as seen in the center of the display, but those steps are silent when the track plays back.

Note: You can tap a step or pad to toggle its mute status no matter which tab you have selected.

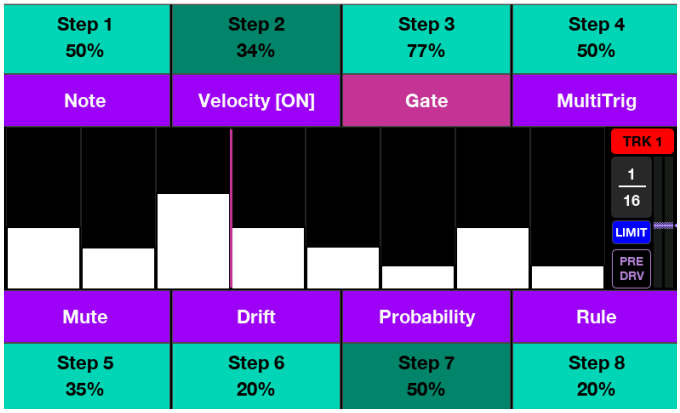
VELOCITY TAB





Velocity [ON] is the only tab with two views. Tap it a couple of times and it toggles between Velocity [ON] and Velocity [OFF]. The bar graphs represent the velocity values from 1-127. (A value of 0 isn't allowed because it was used as a Note Off message in the early days of MIDI.)

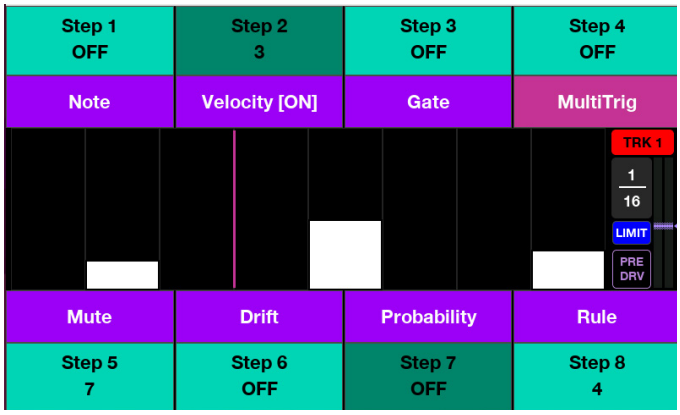
GATE TAB



This shows the gate time of the note(s) in each step. Values above 100% indicate a tied note when the notes in adjacent steps are identical.

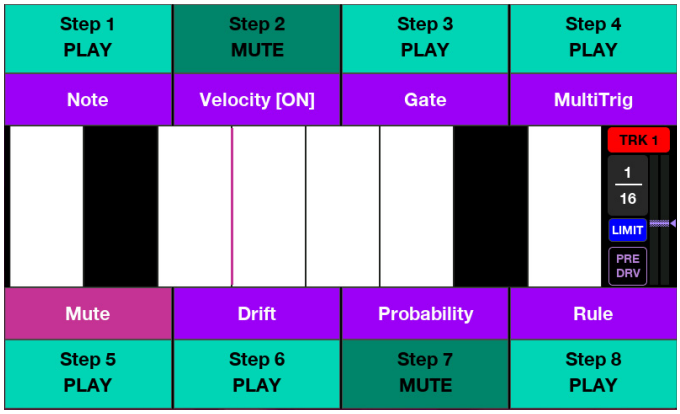
Note that these values can be superseded by the Gate Fix value on Track Params page 2, as explained in *Note tracks: Page 2 (settings) (p. 110)*. You can also make relative adjustments to the Gate length of every step in both note tracks using the Gate encoder, located immediately above the Track Edit buttons.

MULTITRIG TAB



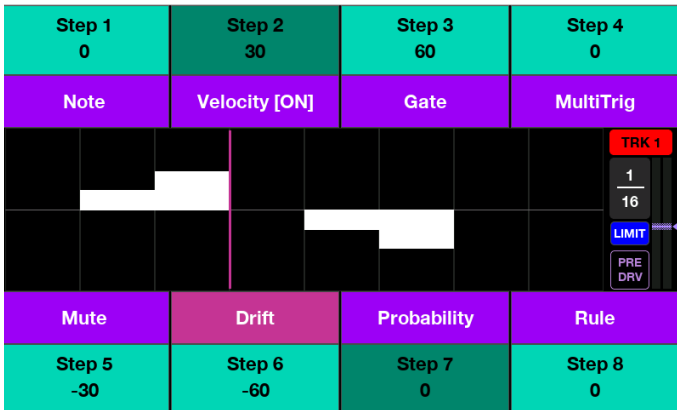
Each step can have a different MultiTrig value, which enables the note(s) in a step to retrigger 2-16 times within the same step. MultiTrig behavior is also affected by the Gate mode as defined on *SEQ Settings: Page 1 (per sequence) (p. 111)*.

MUTE TAB



As mentioned earlier, steps 2 and 7 are muted in these examples. The Mute tab provides a different view of the mute status in the center of the display. It's a binary parameter (On or Off), so a step is either black or white. You can toggle the status by tapping the appropriate soft button in the outer row, or by tapping the corresponding pad.

DRIFT TAB

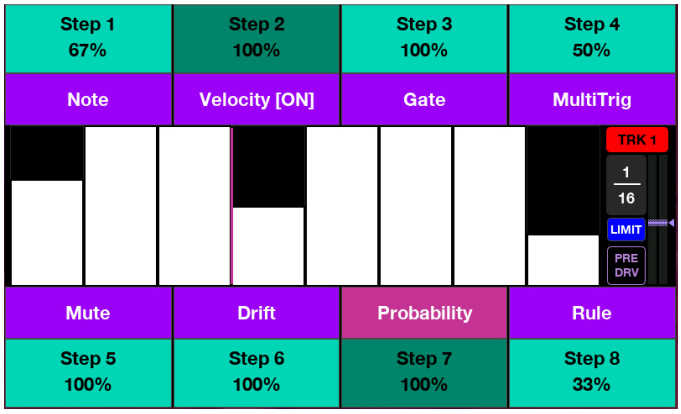


Sometimes the essence of a groove is how certain notes anticipate the beat and others lag behind it. That's what this parameter does; it lets you adjust the precise moment when a note is triggered. It can be late (positive values) or early (negative values).

Tip: If you hold [SHIFT] and turn Control knob 1 you can make relative adjustments to the Drift values of all steps at the same time. [SHIFT] + Control knob 2 sets all steps to the same value.

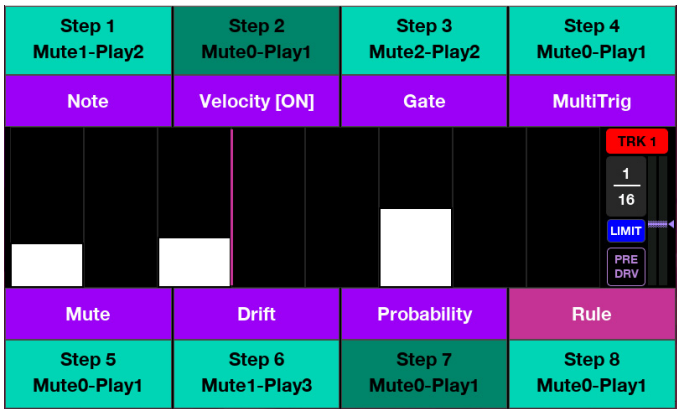
Those techniques are true of every tab in Track Edit mode, but this seemed like a good time to mention it. There are more tips like that listed in *Tricks & Techniques (p. 116)*.

PROBABILITY TAB



As if we weren't having enough fun already, this parameter lets you adjust the likelihood that a particular step will be triggered during playback.

RULE TAB



This is the OCD version of Probability. Each step can be instructed to be silent during the first loop, for example, and then to play during the second loop. That's the Entropy Rule "Mute1-Play1". There are lots of other options! There's a table that lists them all in the next section.

ENTROPY RULES

The format of each rule is the same: MuteX-PlayY. The Entropy cycle counter resets if you stop playback and press [PLAY] again.

Two more examples:

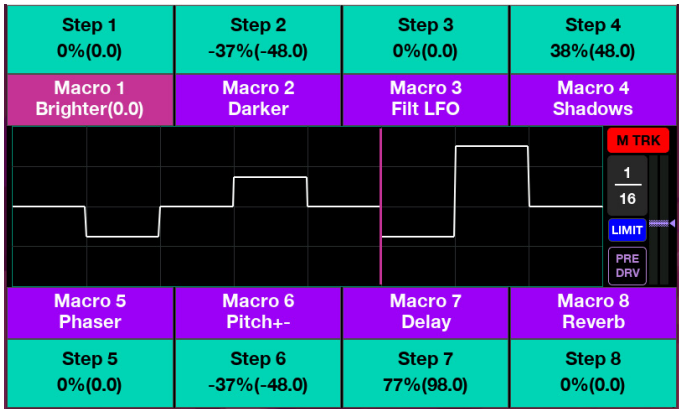
- **Mute2-Play1**: The Entropy cycle is 3 loops long. Mute this step the first 2 times, play it the third time, repeat.
- **Mute1-Play7**: The Entropy cycle is 8 loops long. Mute this step the first time and play it the other 7 times.

Here's a list of all the Rules. We omitted the first setting (Always) to make it easier to see the relationships between the number of Mutes and Plays in each Entropy cycle.

Mute1-Play1	Mute1-Play2	Mute1-Play3	Mute1-Play4	Mute1-Play5	Mute1-Play6	Mute1-Play7
Mute2-Play1	Mute2-Play2	Mute2-Play3	Mute2-Play4	Mute2-Play5	Mute2-Play6	
Mute3-Play1	Mute3-Play2	Mute3-Play3	Mute3-Play4	Mute3-Play5		
Mute4-Play1	Mute4-Play2	Mute4-Play3	Mute4-Play4			
Mute5-Play1	Mute5-Play2	Mute5-Play3				
Mute6-Play1	Mute6-Play2					
Mute7-Play1						

Macro Track Edit mode

The Macro Track Edit page looks a bit different than the Track Edit pages for the note tracks.



As with all tracks, the outer row of soft buttons selects the steps within the current step group. You can use the Page Up / Down arrows to select different step groups.

Macro Track Edit mode has an inner row of soft buttons too, but each of the tabs selects a specific Macro so you can zero in on the automation you've recorded for that Macro. The Macro names you see might be different depending on which patch is currently selected.

What's interesting about these tabs is that they display not a fixed value, but relative adjustments of the Macro in each step.

As mentioned earlier, there isn't a Step Record mode for the Macro track. But this is the next best thing; you can dial in a specific value for each step and have it jump suddenly to a new value at just the right time, or make a slight adjustment between steps for more subtle, but equally valuable effects.

And don't forget to check out the relative, mass adjustments you can make as described in *Tricks & Techniques (p. 116)*.

Track Editing basics

SELECTING STEP GROUPS

Track Edit pages are organized in groups of 8 steps, with page access limited to the current track length. You can also select step groups with the Page Up / Down arrows.

TRICKS & TECHNIQUES

The Track Edit pages have some cool shortcuts:

- Hold [SHIFT] + turn Control knob 1: Offset all step values simultaneously.
- Hold [SHIFT] + turn Control knob 2: Set all steps to the same value.
- Note tab only: Hold [INIT] + tap step to initialize that step.
- All other tabs: Hold [INIT] + tap step to reset the value for that step.
- Hold note(s) + tap an empty step: The note(s) are added to that step.
- The last played note(s) are held in a buffer, so you can add them to empty steps without playing the keys again.

Real-time recording

UNLOCKED AND LOADED

The sequencer works differently during the first recording pass than it does in all subsequent passes. This is because an initialized track has its length unlocked, which means your first recording can be up to 128 steps long (the track length limit).

The first pass automatically extends track length if Length Lock is disabled (which is the default), so the loop length can be set for you when you capture your idea. When you stop recording the first time on that track, its length locks automatically. If you change your mind you can unlock the Length parameter and try again, or you can set the Length manually to the desired length without having to unlock the length first.

All subsequent record attempts will be overdubs if that parameter is enabled (see *SEQ Settings: Page 1 (per sequence) (p. 111)*), or they can replace existing content when Overdub = Off.

The REC Length Quantize parameter allows for unintentional overruns when you stop the first recording. For details see *SEQ Settings: Page 2 (Global) (p. 112)*.

Note: Depending on the track resolution while recording (i.e., the Rate on Track Params page 1), what you play may be shifted to the previous step or a later one if you are more than 1/2 step ahead or behind the beat.

ENOUGH TALK; LET'S DO IT!

This example walks through recording notes on tracks 1 and 2. Choose a patch and dive in!

Note: Before you begin, hold [SHIFT] and press [PLAY] to enter the SEQ Edit page. You can do all of the following steps from there.

1. Hold [INIT], press [SEQ REC], and press [INIT] again. This erases all tracks and resets all track parameters.
2. Press [TRK PARAMS] and observe: Track 1 Rate = 1/16, Length = 1, and it isn't locked. *Length will lock after the first pass, or you can set Length now and lock it if you want.*
3. Hold [SHIFT] and press [TAP TEMPO] to enable the metronome.
4. Hold [SEQ REC], press [SEQ PLAY], and let the metronome count for 4 beats (1 bar).
5. Play a few notes or chords and record a 4-bar pattern. Use the wheels if you like.
6. Press [PLAY] again to stop recording, and press it again to hear the track.
7. If something isn't right, you can fix it in [TRK 1 EDIT], or use [INIT] + [TRK 1 EDIT] to start over.
8. If the track is OK, hold [SEQ REC], press [TRK 2 ON] to arm track 2, and repeat steps 6-9.

If you want to record some Macro motions, you can add that after the other tracks are done or arm the Macro track during steps 4 or 9. During playback an asterisk will flash inside the Home page soft buttons to indicate Macro track activity.

When you're ready for a deep-dive into the track editing process, there's a lot of great information in *Track Edit (p. 113)* and *Macro Track Edit mode (p. 116)*.

Playback options

There are two Play Modes that provide very different results during playback. These are found on *SEQ Settings: Page 1 (per sequence) (p. 111)*. The options are

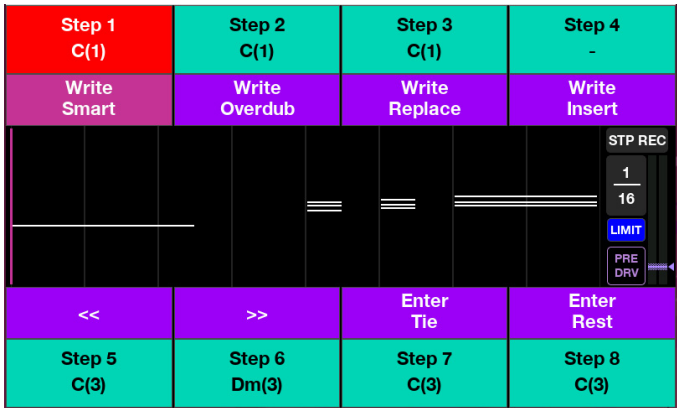
- **Parallel** – The note tracks play simultaneously, and can be muted / unmuted independently.
- **Series** – Only one note track can play at a time: Selecting one mutes the other. When the new track is selected, the first finishes the step it is on, and then the selected track starts from its first step.

The Macro track always plays in Parallel mode, so its data is always available. It can be muted and unmuted too.

Step record mode

Notes can be entered one at a time on tracks 1 and 2 in Step Record mode. You can jump there from any page, but let's start from the SEQ Edit page ([SHIFT] + [PLAY]):

1. Arm Track 1 or Track 2 by holding [SEQ REC] and pressing [TRK 1 ON] or [TRK 2 ON].
2. Hold [SHIFT] and press [SEQ REC], and you're there.



This page is similar to Track Edit mode in that it contains inner and outer rows of soft buttons. You'll see the familiar sight of 8 steps on the outer

soft buttons, and you can access the step groups with the Page Up / Down arrows as before. But the contents of the inner row tabs are completely different.

FOUR STEP-ENTRY MODES

The first four tabs on the inner row contain the four write modes that are available in Step Record mode, and you can switch instantly between them while entering notes:

- **Write Smart**: Erases existing notes on first input, and advances automatically to the next step after note release.
- **Write Overdub**: Adds notes to existing content, and advances to the next step after note release.
- **Write Replace**: Replaces notes but stays on the current step.
- **Write Insert**: Creates new steps that push existing content forward.

STEP NAVIGATION, TIES, AND RESTS

The four tabs on the lower, inner row include on-screen navigation (<< / >>) and special functions like **Enter Tie** for legato notes and **Enter Rest** for silent steps.

STEP RECORD EXAMPLE

This example goes through the process of entering notes in step-record mode on track 1. Choose a patch and let's take the plunge! Starting from the SEQ Edit page ([SHIFT] + [PLAY]):

1. Hold [INIT], press [SEQ REC], and press [INIT] again. This erases all tracks and resets all track parameters.
2. Press [TRK PARAMS] and observe: Track 1 Rate = 1/16. This is the time value for the steps you are about to enter. You can set it to another value later if you like.
3. Track length doesn't matter yet; the length is determined by the number of steps you enter.
4. Hold [SHIFT] and press [SEQ REC] to enter Step Record mode.

   Notice that Step 1 is red. This is the current step.
5. Play a note and release the pad.

   Step 1 now contains that note, and the cursor advances to step 2 (now red).
6. Play a chord and release the pads.

   Step 2 displays the chord name, and the cursor advances to step 3 (now red).
7. Press tab 8 (Enter Rest) on the inner row to enter a rest.

   The cursor advances to step 4 (now red).
8. Play another chord and release the pads.

   Step 4 contains the chord, and the cursor advances to step 5 (now red).
9. Press tab 7 (Enter Tie) four times to tie the chord through step 8.
10. Press [PLAY] to hear the track. The display immediately switches to Track Edit mode.
11. If something isn't right, you can fix it in [TRK 1 EDIT], or use [INIT] + [TRK 1 EDIT] to start over.
12. If the track is OK, hold [SEQ REC], press [TRK 2 ON] to arm track 2, and start from step 5.

You can't record in step time on the Macro track, but you can add Macro values manually in *Macro Track Edit mode (p. 116)*.

PAD MODE = STEP SEQ

In *Using the Pads (p. 30)* we describe how the pads work when Pad Mode = Play. That mode is great for live performance and real-time recording. In this chapter our focus will be on the other Pad Mode: the Step Sequence mode.

The pads are perfectly suited for step sequencing, and can make the music production process more efficient and enjoyable. These RGB pads can be bright, dim, dark, white, cyan, or red, to tell you:

- the length of a track
- which steps contain notes and which don't
- the location of the play / record cursor
- the status of each step at a glance.

And with 16 pads, you can view two 8-step groups at once. We'll call these Pad Groups. This table illustrates the idea:

When the display shows...	...the Pads show...
Steps 1-8	Steps 1-16
Steps 9-16	Steps 1-16
Steps 17-24	Steps 17-32
Steps 25-32	Steps 17-32

... and so on. You can use the Page Up / Down arrows to switch between Pad Groups.

Using STEP SEQ mode

To get started, hold [INIT] and press [SEQ REC] to initialize all tracks and their parameters. Then toggle the [PAD MODE] button repeatedly and watch the pads.

- When Pad Mode = Play, the pads show various colors and you can play notes and chords.
- When Pad Mode = STEP SEQ, the pads are all dark. This is because track 1 is empty; it has no data or length.

Now press pad 2. Pads 1 and 2 become lit, and pad 2 is cyan. All other pads are dark. Here's how pads 1-8 would look:

Let's find out what's going on.

1. Hold [SHIFT] and press [PLAY] to enter the SEQ Edit page.
2. Press the onscreen [TRK PARAMS] button. Notice that Track 1 Length = 2.
3. Press pad 4, and now Length = 4. Four pads are lit and pad 4 is also cyan. 2 pads are grey, and the rest are dark.
4. Use Control knob 2 to change the Length to 8. Now pads 1-8 are lit.
5. Press [EXIT] to reach the SEQ Edit page again, then press [TRK 1 EDIT] and let's talk about what you see.

As you can see, the colors and lighting of the pads matches what is seen in the display. Steps 2 and 4 have content (a single note), and the other steps are lit but empty. What the steps contain depends on whether the unit was just powered up or you had played some notes earlier. This note buffer is explained in *Tricks & Techniques (p. 116)*.

6. Tap soft button 2; it grows dim, as does pad 2. This step is now muted.
7. Do the same on pad 2, and both it and soft button 2 become bright again. This unmutes the step.
8. Press [EXIT] and tap [TRK PARAMS] in the display.
9. Watch the pads as you change the Track 1 length to 16. Now all pads are lit, but steps 5-16 are empty.
10. Press [EXIT] and tap [TRK 1 EDIT] in the display.
11. Tap pad 12. It becomes lit, but the display does not change.
12. Press the Down arrow. The display shows the second step group (steps 9-16), and Pad 9's contents are visible.

If you had pressed the Down arrow before step 9 it wouldn't have done anything, because there was no second step group; the track only had 8 steps. But you already knew that, because the pads were telling you that all along.

13. Press [PLAY] and watch the buttons. As the track plays back, the pads each turn white as their step is reached. This is the playback cursor. It matches what is happening on the display, except the display alternates between step groups 1 and 2.
14. Press a few more pads to place notes in those steps. As the cursor wraps around you'll hear those notes and see them in the display.

Tip: Technically we're not in Step Record mode; we entered the SEQ Edit page in step 1 of the example. But you can actually do quite a bit of data entry on the SEQ Edit page by switching the Pad Mode to Play, playing a note or chord to fill the buffer, and then switching the Pad Mode to STEP SEQ again and pressing one or more soft buttons. And while you're there you can switch tabs and make other edits to Velocity, Gate, Drift, etc. You can even transpose the notes of any step by turning its Control knob while on the Notes tab.

More tips & shortcuts

TYING NOTES AND CHORDS

If you hold a pad and then press another pad to the right, this is a quick way to enter a tied note or chord. The Gate time of the held pad becomes 150%, as do the Gate times of all pads between the held pad and the furthest one you tap. The last pad is given the default gate time of 50%. You can do this from almost anywhere as long as the Pad Mode = STEP SEQ.

AUTO FLIP PAGE (OR NOT)

When a pattern is longer than 16 steps you can set Auto Flip Page to Off while you focus on a certain group of 16 steps. The cursor will always follow the steps as they are played, but there might be times when you won't see it. And of course, you can always use the Page Up / Down arrows to select the Pad Groups manually.

The Auto Flip Page parameter is located on *SEQ Settings: Page 3 (Global) (p. 113)*.

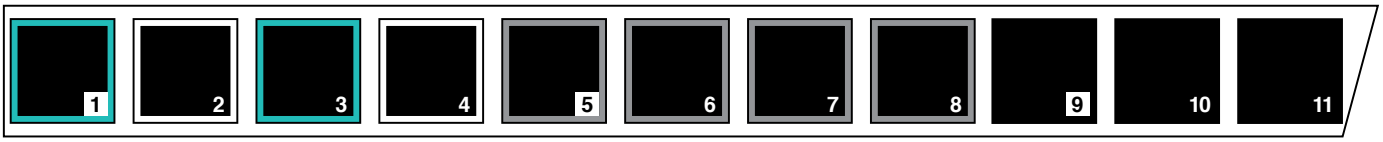
PAD GROUP JUMP

The Pad Group jump is a great shortcut to use when you want to switch quickly between Pad Groups and make specific edits in several places to the armed track. You can do this from almost anywhere as long as the Pad Mode = STEP SEQ.

Hold [SHIFT] and look at the pads. Each one represents one Pad Group (16 steps): Pad 1 represents Pad Group 1 (steps 1-16), pad 2 represents Pad Group 2 (steps 17-32), etc.

Only 8 pads are lit because the maximum track length is 128 steps. Pads 9-16 will always be dark in Pad Group jump mode.

In the following graphic the pads are showing you which Pad Groups have data, which groups are inside the track length, and which groups are outside the track length. If a Pad Group contains any notes, it is outlined in cyan. If the Pad Group has no notes at all, it is outlined in white. If the Pad Group is outside the track length, it is outlined in grey (whether it contains notes or not).



For example, the graphic above shows a track that only has notes in steps 1 and 34, with a track length between 49-64 steps. If the track length were 128 steps, pads 5-8 would be white; but since they're grey, you know the track length does not include them. They can't be accessed from this view.

OTHER SEQ FEATURES

Record Arp Notes to a Track

The Arpeggiator output can be recorded directly into sequencer tracks, allowing you to capture arpeggiator patterns and then edit them as step sequences. This workflow combines the spontaneous nature of arpeggiation with the detailed control of step sequencing.

To record arpeggiator output:

1. Set up your arpeggiator pattern
2. Arm the desired sequencer track
3. Press SEQ RECORD to begin capturing
4. Play notes to trigger the arpeggiator
5. Stop recording when complete

The arpeggiator output becomes editable sequence data that you can modify using all step editing functions.

Using SEQ with External Devices

The sequencer's comprehensive MIDI and CV routing makes it effective for controlling external devices. Each track can be routed to different MIDI channels or CV outputs, turning the sequencer into a multi-track controller for complex setups.

MIDI Routing: Set different MIDI TX channels for each track to control separate external instruments while maintaining sync.

CV Output: Enable CV TX on note tracks to control analog synthesizers with pitch and gate signals.

MASTERING THE MACROS

Macros are powerful, expressive tools for song creation and live performance. Every Single mode patch can have up to 8 Macros, so a Multi has access to as many as 16 of them.

Each Macro is a combination of one of the Control knob / Soft button pairs and a list of destinations, sort of like a private Mod Matrix grouped around the display. In fact, Macros can even control the Mod Matrix mod routes (and vice versa).

Note: When Leviasynth is on the Home page, we'll refer to the Soft buttons as Macro buttons. In other contexts the same buttons are called Soft buttons because they do not activate Macro functions on those pages.

For the sake of simplicity, in this section we will assume the Leviasynth is in Single mode. Details about using the Macros in Multi mode are provided in *How to route a Macro (p. 131)*.

HOME PAGE

Here are a few things to know about Macros:

- The LED rings around the knobs indicate the current values of the Macros.
- The color and status of a Macro button changes when it is activated: If the button is cyan and the text is dark, the button has been activated.
- The Control knobs are "masked" when a Macro button is active. The values change but are not transmitted until the button is deactivated.
- Macro buttons can be configured to work 4 different ways in *The System Pages (p. 154)*. The options are described in *Macro Button Response (p. 123)*.

If you haven't tried out the Macro controls yet, press the [HOME] button to jump to the Home page. That's where the action is: the Control knobs and Soft buttons are supercharged on this page, sort of like the pedals on steroids. Each Control knob is paired with a Soft button to affect up to 8 parameters at once: The knobs sweep parameter values and the buttons toggle, trigger, or reset them; see *Control Settings (p. 156)*. Modulation levels can be positive or negative, so a Macro can reduce values, increase them, or do both at the same time.

It's easy to see which Macros are active on the Home page: If a Macro field displays a zero or some other number, it has at least one parameter assigned. If the Macro field has a dash, not a number, then it is empty.

Here's a handy tip when using Macros on the Home page: If you hold [INIT] and turn a Control knob, the Macro will jump to 0.0 from its current value. This prevents the generation of intermediate values.

The Macro button is exclusive; when it is engaged the Control knob is locked out temporarily. This allows you to change the Control knob "behind the scenes", so that the new Macro value is revealed after disengaging the Macro button.

MAKE A MACRO

Find a fun patch, press [MACRO ASSIGN], and let's explore how they work. At this point all eight Macros show their names and "Edit..." whether they're empty or not. From here you can inspect or modify an existing Macro by pressing its soft button to enter the Macro Edit page. After that, here's what you'll see in the display:

Sort	Dest 1	Dest 2	Dest 3
Module	OSC 6	ENV 3	A. Filter
Parameter	Initial Level	Decay	ENV 2 Amt
Button Value	128.0	-63.8	0.0
Depth	128.0	-64.5	15.2
Audition			

- The left-most column has labels for the center rows in white.
- Soft buttons 1 and 5 activate the Sort and Audition functions. We'll cover those later.
- Destinations 1-3 are listed in the top row. Use the Page Up / Down arrows to select Dest 4-6 and Dest 7-8, or press [MACRO ASSIGN].
- The Module row shows the selected module; the Parameter row shows the selected parameter within that module.

- The middle line of the page shows the Button Value.
- The next line down shows the modulation Depth for the knob.

Sort and Audition

Inside the Macro Edit page, Soft buttons 1 and 5 show the words Sort and Audition, respectively. Here's what they do:

SORT

A Macro can hold up to 8 routes. Sometimes when making a patch you'll decide to add a Macro route, and then you decide you'd like to increase or decrease another parameter with the same Macro. You might have initialized an unused route between two other routes. The more routes you add and subtract, they might end up in an order that isn't as easy to figure out when you want to make an adjustment later.

That's where [Sort] comes in. When you press that it reorganizes the Macro routes by module and parameter, in the same order they appear when selecting destinations. The routes and values are preserved. The empty routes are placed at the end where it's easier to find them and fill them up!

Note: This only sorts the Macro you're editing. It doesn't affect the other Macros.

AUDITION

While making a Macro there's a way to preview how it will behave without having to return to the Home page, try it, and then navigate back to where you were. Here's how:

- To audition the Macro knob response, turn Control knob 5 (the one below the word Audition).
- To audition the Macro button response, simply press the word Audition.

These actions are linked to the Macro controls on the Home page, so if you turn the knob and activate the button, then press [HOME], you'll see the Control knob display and LED ring sporting the value you set on the Macro Edit page, and the Macro button highlighted in cyan.

Likewise, if the Macro controls are altered on the Home page, those values are duplicated inside the Macro Edit page for that Macro.

Assign a Destination

For the purposes of this exercise, let's start with an empty Macro. We'll be working with Macro 1.

Additional information for some steps is included below in italics.

1. Start by pressing [HOME] and then [MACRO ASSIGN].
2. Hold [INIT] and press Soft button 1 to initialize Macro 1.
3. Release [INIT] and press Soft button 1 again to enter the Macro Assign page.
4. Press [Assign...] in the first column to activate the Assign function for the first slot in Macro 1.

   Many of the colored Access buttons are lit now; these are potential destinations.
5. For this example, press [OSC 1] to select it. Instantly the first column is populated with Osc 1, Initial Level, and zeroes.
6. Press the field that says Initial Level, and use Control knob 2 to select Pitch.
7. Turn Control knob 6 to set an amount of 120.0. Use [SHIFT] to fine-tune the value.
8. Press the Button Value field to enter a value.
9. Use Control knob 2 and [SHIFT] to set a value of 20.0.

   The upper Control knob always edits the highlighted field.
10. Hold a note and use Control knob 5 and Soft button 5 to audition the Macro.

    The Macro knob / Macro button pair you are editing will behave this way on the Home page.
11. With these settings the knob sweeps an octave; the button jumps a whole step.

    Up to 8 routes can assigned to a Macro. Use this method to audition them all at once.

Note: The Macro Destination list is the same as the list of *Modulation Destinations (p. 128)*.

Macro-making Tips

- When choosing the destination Module for a Macro route, you can hold [SHIFT] and turn the relevant Control knob to jump from one parameter group to the next: OSC 1 > ALL OSC, ENV 1 > LFO 1, etc.
- You can also select a Macro destination while editing the Macro by pressing a lit button or turning a knob on the top panel.
- There are several ways to use [INIT] while making a Macro:
  - [INIT] + the upper Destination field clears the Macro route.
  - [INIT] + the Parameter field selects the first available parameter in that module.
  - [INIT] + Button Value or Depth resets those to zero.
- Note: The Page buttons cannot change the page when a highlight cursor is visible.

The Macro Button parameter on System > Control Settings defines the behavior of the Macro buttons: If the setting is "Trigger" or "Reset" the button is a Trigger. When set to "Toggle" or "Switch," the button behaves as a Toggle.

When a Macro is controlling a Mod route, keep this in mind: With Mod route Depth = 0 and Macro Depth at +128, the first half of the Macro knob range covers the full mod range (0-128) and the last half of the range does nothing. But with Mod route depth at -128, the Macro knob covers the full range from -128 to +128 with no dead zone. This applies to all bipolar destinations: Osc. ENV levels, etc. If you want the Macro knob not to have a dead zone with Mod route Depth = 0, set Macro Depth to 64.

Name the Macro

Macros can be given a name with up to 8 characters, so you'll know at a glance what the Macro does. The name is displayed on the Home page and on the Macro Assign page. Here's what to do:

1. From the Home page, press [MACRO ASSIGN].
2. Select the Macro you want to edit by pressing its Soft button.
3. Hold [SHIFT] and press the Page down arrow to reach the last page.
4. Control knob 1 selects the naming function: List Name or Custom Name.
5. **List Name**: Use Control knob 2 to choose a preset name. There are lots of them; see *Preset Macro Name List (p. 124)* at the bottom of this chapter. Hold [SHIFT] and turn the knob to jump through the list alphabetically.
6. **Custom Name**: Tap the name field (Soft button 2) and a QWERTY keypad appears. Enter up to 8 characters, press the on-screen ENTER button, and then [EXIT].

Tip: Use List Name to find a name that's close to the one you want, then switch to Custom Name and add/remove characters as needed.

Macro Slot Copy

There's a quick way to set up several complementary routes within a Macro.

1. Press [MACRO ASSIGN] to access the Macro Assign page.
2. Press the Soft button of the desired Macro to enter its Destination page.
3. Use the Page Up / Down arrows to locate the route you want to copy.
4. Press and hold [SAVE]. The assigned Module and Parameter cells on that page turn cyan. These are the routes you can copy.
5. Press one of the cyan cells inside the route you want to copy.
6. The Module and Parameter cells for the other two slots turn magenta. These are available as paste destinations.

   If you decide not to paste the data, release [SAVE] now. Otherwise, keep holding it.
7. If the desired destination Macro slot is on a different page, use the Page Up / Down arrows to select that page.
8. Press any cyan field within the desired Macro slot to paste the copied settings there.
9. The Module and Parameter settings are pasted to the target slot; the Button Value and Depth are set to their defaults (zero).
10. Adjust the Module, Parameter, Button Value and Depth as needed.

SAVE THE PATCH: MACRO OPTIONS

The [SAVE] button has its own chapter, but we want point out this part of it now. While saving the patch, Control knob 7 lets you specify whether the current positions of the Macro knobs will be returned to zero (Return) or stored in their current positions (Save). There's also a third option that translates the Macro knob positions into new values for the parameters they control (Convert). For more information see *Patch Management (p. 140)*.

MACRO BUTTON RESPONSE

There's a separate chapter for *The System Pages (p. 154)*, but this information affects how the Macro buttons behave on the Home page and while auditioning a Macro during editing.

To access the Macro Button settings, press [SYSTEM] and select Control Settings in the display. Use Control knob 3 to select one of the four options: Toggle, Trigger, Switch, and Reset.

- **Toggle**: The Macro button toggles between the Button Value setting and the current Macro knob value.
- **Trigger**: The Macro button triggers the Button Value On when pressed and Off when released.

- **Switch**: Only one Macro button can be selected at a time.
- **Reset**: The Macro button resets the corresponding Macro Knob to zero

Using a Macro button on the Home page while holding [SHIFT] changes the behavior.

When Macro Button setting is...	[SHIFT] + Macro button response is...
Toggle	Trigger the Button Value On when pressed and Off when released.
Trigger	Hold the Button Value setting until released manually
Switch	Allow more than one Macro Button to be selected
Reset	(no response)

PRESET MACRO NAME LIST

These are the preset Macro names found on Macro Edit page 4. Hold [SHIFT] and turn the knob to jump through the list alphabetically. You can also create your own Macro names; see *Name the Macro (p. 123)*.

Macro names				
2nd	Crunch	Go	Overdriv	Snarl
3rd	Crystal	Harmonic	Pan	Space
4th	Cutoff	Harmony	Phase	Spin
5th	CV 1	HTE Sync	PhazDist	Spread
6th	CV 2	Hurt	PhazMod	Stank
7th	Darken	Itch	Phrase	Stop
Air	Decay	Jianbing	Pitch	Stretch
AlgoMrph	Delay	Level	Poly	Sub
Amp	Depth	LFO Amt	Pressure	Swing
ArpMode	Distort	Mai Tai	PulsWdth	Teardown
Attack	Drive	Major	Pumpkins	Thicken
Bacon	Dry/Wet	MakeHuge	Purr	Thin
Bark	Env Amt	Mangle	PW Mod	Time
BassDrop	EQ - Hi	Massage	Range	TimeDiv
Beef	EQ - Low	MIDI CC	Ratchet	Twist
Bend	EQ - Mid	Minor	Rate	Velocity
Bite	Fast	Mod 1	Ratio	Vowel
Bleed	Feedback	Mod 2	Release	Warp
Breath	Filter	Mod Amt	Reso	WavStack
Brighten	Flanger	Morph	Reverb	Width
Buildup	Freq Mod	Noise	Rotary	Wobble
Chance	Force	Oct -	Rumble	Woof
Chord	Funk	Oct +	Scratch	Wow
Chorus	GateTime	Oh	Sequence	–
Compress	Glide	Ouch	Slow	–

THE MOD MATRIX

Modular synthesizers use cables to make connections. Leviasynth has a neater solution: an easy-to-use internal patch bay with 32 sets of modulation sources and destinations.

CREATING MOD ROUTES

There are three ways to create a new mod route in the Mod Matrix. The first is to access the Mod Matrix page directly. *Additional notes are entered below some steps in italics.*

The Whole Process

1. Press [MOD MATRIX] to access the Mod Matrix page.
2. If the mod route is empty, press [Assign...]. To change an existing mod route, press the Source field.

   The colored buttons that are most brightly lit are the available source modules.
3. Scroll the top Control knob to select a source.

   Shortcut 1: Hold [SHIFT] while turning the Control knob to jump through modules by category.
   Shortcut 2: Press one of the lit module buttons to select it.
4. Press the top half of the Destination field in the display. This is where you select the target module.

   The buttons for the available modules are now lit; these are the potential destinations.
5. Scroll the top Control knob to select the destination module. Its default parameters appear in the next three cells.

   Shortcut 1: Hold [SHIFT] while turning the Control knob to jump through modules by category.
   Shortcut 2: Press one of the lit module buttons to select it.
   Shortcut 3: Turn one of the top-panel knobs to select that parameter.
6. Press the lower half of the Destination field in the display. You'll select the target parameter here.
7. Scroll the top Control knob to change the parameter... *...unless you used Shortcut 3 in step 5 already.*
8. Press the [EXIT] button to exit the assign mode.
9. The bottom Control knob can change the modulation depth at any time during steps 3-8.

The Shortcut

Mod routes can be established quickly from almost any page:

1. Press and hold the module button for the *Modulation Sources (p. 127)*].
2. Press the module button for the *Modulation Destinations (p. 128)*.

   The Mod Matrix opens at the first available slot with the first parameter of the destination module highlighted.
3. To select a different target parameter from that module, press the lower half of the Destination field.

   Shortcut: If the parameter has a top-panel knob, turn it to select that destination.
4. Use the upper Control knob to select the desired parameter.
5. Use the Control knob on the bottom row to set the modulation amount.

   The modulation amount can be positive or negative.

The shortcut method works inside and outside of the Mod Matrix page. The difference: Inside the Mod Matrix the available destination module buttons light up when the source module button is held. Outside the Mod Matrix they don't.

Direct Assignment

Mod routes can be established between a source and a specific parameter using this method. After you access the page with the parameter to be modulated, hold a modulation source button and press the Soft button next to the parameter in the display. This creates a link between the source and destination in the fewest possible number of steps.

For example, here's how to route ENV 5 to the LFO 1 Amount of Filter 1:

- Press [ANALOG FILTER] to access that module.
- Press and hold [ENV 5] to select it as the mod source.
- Press Soft button 2 in the display to select LFO 2 Amt as the destination.
- The mod route ENV 5 to the Analog filter's LFO 2 Amount parameter is created.
- Use the Control knob beneath the display to set the modulation Depth, and you're done!

Sort and Slots

Inside the Mod Matrix, Soft buttons 1 and 5 show the words Sort and Slots->, respectively. Here's what they do:

SORT

The Mod Matrix can hold up to 32 routes. This allows a lot of creative thinking when making a patch! So after you've added a few mod routes, then you decide it'd be cool to increase or decrease other parameters using some of the same sources, so you *Copy Mod X to Mod Y (p. 126)* and make some tweaks, etc. Next thing you know, there are so many routes that it's hard to figure out what's happening when you want to make an adjustment later.

That's where [Sort] comes in. When you press that it reorganizes the mod routes by source, in the same order they appear when creating a mod route. The other mod route settings are preserved. The empty routes are placed at the end where it's easier to find them and fill them up!

SLOTS

Soft button 5 is labeled **Slots->**. It helps navigate through the Mod Matrix quickly and easily. Here's how it works.

When one of the cells inside a mod route is selected (cyan highlight), the Slots feature provides two options:

- Press Soft button 5 to move the cursor sideways to the cell in the next mod route.
- Turn Control knob 5 to move the cursor through every cell on the page in either direction.

When either of those controls exceeds the third mod route on the page, it shifts to the next set of 3 mod routes. When they reach the last slot of mod route 32, they stop. You can use [SHIFT] + Page Up to jump back to mod routes 1-3, if you want.

Notes About Mod Routes

Here are some concepts to keep in mind while working with Mod Routes:

- Some modules cannot be modulation sources, such as the Filters, the FX, or any of the Oscillator Group Edit modules. Those buttons are dark when selecting a source.
- Some modules can be sources and destinations, such as Envelopes and LFOs. With these, the order in which you press them determines the source and the destination.
- Not all destinations can respond to polyphonic sources with independent modulation per note. For example, routing PolyAT to Reverb Time won't give different reverb times for each note. The latest input value overrides all previous values.
- Only the first two parameters and the Wet/Dry mix of the Pre-/Post-FX can be modulated.
- Modulation has limits. For example, if a parameter reaches its minimum value, it can't go any lower. It's the same if you try to increase a value when it's already maxed out; there's no headroom to take the value higher.

Tip: If you need another Env source, use the Oscillator Envelope from an unused oscillator. Leviasynth has a total of 13 Envelopes available as mod sources!

If all 32 modulation routes are occupied and you try to add another, the display will show a message for two seconds that says “Mod Matrix Slots Full!”

MORE SHORTCUTS

Copy Mod X to Mod Y

You can copy one Mod matrix slot to another and make one or more derivative routes. But it won't work if a mod route field is highlighted; press [EXIT] first.

1. Starting from the Home page, press [MOD MATRIX].
2. Press and hold [SAVE]. *The populated Source and Destination cells are lit cyan.*
3. Tap the Soft button of the source route to be copied.
4. **Warning!** The next step will replace what's there, so choose an empty slot.
5. Press the Soft button of the target route.
6. Modify the destination module, parameter, and modulation depth as needed.

Clear a Mod Slot

To clear a single Mod matrix slot, hold [INIT] and press its Module field in the display.

Clear the Entire Mod Matrix

If you want to start over with all new mod routes, hold [INIT] and press the [MOD MATRIX] button. A prompt will ask you to confirm the decision, because it's a big one. If you're sure, press [INIT] again.

Be Random

If you're looking for something crazy, hold

[RANDOM] and randomize a mod route, any of its components, or the entire Mod Matrix! You might get lucky or you might get nothing. You can always try again!

Before you do, though, check the results by trying a few mod sources: aftertouch, start the arpeggiator, etc. There could be a hidden gem there. And once you get something interesting, dial in a few changes to make it perfect.

MODULATION SOURCES

These are the mod sources available in the Leviasynth. Some may need explanation; see below the chart.

Group	Modulators
Env	Env 1, Env 2, Env 3, Env 4, Env 5
LFO [1]	LFO 1, LFO 2, LFO 3, LFO 4, LFO 5, LFO 1+, LFO 2+, LFO 3+, LFO 4+, LFO 5+
OSC Env	OSC 1 Env, OSC 2 Env, OSC 3 Env, OSC 4 Env, OSC 5 Env, OSC 6 Env, OSC 7 Env, OSC 8 Env
Keytrack	Keytrack (center note = C4 for all mod sources except filter keytrack [center = C2])
Aftertouch	PolyAT (Polyphonic Aftertouch), MonoAT (Channel Aftertouch)
Velocity	Velocity On (Note On velocity), Velocity Off (Note Off velocity)
Voice [2]	Voice Mod, Voice Mod+
Wheel	Mod Wheel, Pitch Bend
Ribbon [3]	RbnAbs (Ribbon Absolute bipolar), RbnAbs+ (Ribbon Absolute unipolar), RbnRel (Ribbon Relative)
MPE [4]	MPE-X, MPE-Y Relative, MPE-Y Absolute
Pedal	Exp Pedal (Expression pedal), Sus Pedal (Sustain pedal)
CV	CV Mod In 1, CV Mod In 2
MIDI	CC [000-127]

[1] An LFO is normally a bipolar source. A plus sign [+] means that LFO will modulate the target positively or negatively without crossing the zero point. The direction is set by the mod depth.

[2] A plus sign [+] indicates a unipolar source derived from VoiceMod Edit.

[3] The desktop unit doesn't have a ribbon controller, but this mod source allows a Leviasynth keyboard, Hydrasynth, or Hydrasynth Deluxe to control these mod routes.

[4] MPE-X = pitch bend
MPE-Yabs = CC# 74 in some devices (absolute mode)
MPE-Yrel = CC# 74 in some devices (relative mode)

MODULATION DESTINATIONS

These are the potential mod destinations in the Leviasynth. Some may need explanation; see below the chart.

Group	Parameters
Osc 1–8 [1] [2]	Initial Level, ENV Level, Pitch, Ratio, Fine, Feedback, Phase, Pan, Wave, Attack, Hold, Decay, Sustain, Release
All Osc [1] [2] Osc Carriers Osc Modulators	Initial Level, ENV Level, Pitch, Ratio, Fine, Feedback, Phase, Pan, Wave, Attack, Hold, Decay, Sustain, Release Initial Level, ENV Level Initial Level, ENV Level
D. Filter	Cutoff, Resonance, Morph, Drive, ENV 1 Amt, LFO 1 Amt, Level
A. Filter	Cutoff, Resonance, Pre-drive, ENV 2 Amt, LFO 2 Amt
VCA	Level, LFO 3 Amt
Pre-FX Delay Reverb Post-FX	Param 1, Param 2, Dry/Wet Time, Feedback, Wet Tone, Feedback Tone, Dry/Wet Time, Tone, High Damp, Low Damp, Dry/Wet Param1, Param2, Dry/Wet
Env 1–5	Attack, Hold, Decay, Sustain, Release, Level, Attack Curve, Decay Curve, Release Curve
LFO 1–5	Rate, Level, Smooth, Steps
Voice	Unison Detune, Pan, Analog Feel, Pitch Bend, Vibrato Amt, Vibrato Rate, Glide Toggle (Off / On), Glide Time, Glide Curve, Panner Width
ModMtrx [3]	Depth [01-32]
Macro	Macro 1 – Macro 8
Arp	Mode, Division, Swing, Gate, Octave, Octave Mode, Length, Phrase, Entropy Shuff, Ratchet, Chance
SEQ Trk 1	Gate, MultiTrig, Drift, Probability, Entropy Rule, Rate, Length, Mode, Swing, Step Offset, Transpose
SEQ Trk 2	Gate, MultiTrig, Drift, Probability, Entropy Rule, Rate, Length, Mode, Swing, Step Offset, Transpose
SEQ Macro Trk	Rate, Length, Mode, Swing, Step Offset, Scale, S&H, Bit Redux
CV	Mod Out 1, Mod Out 2
MIDI [4]	CC [000-127]

[1] Ratio & Fine have no effect as mod destinations when Osc Pitch Mode = Semitone or Frequency.

[2] Oscillator Pan has no effect when [VOICE] Osc Stereo = Off.

[3] ModMtrx: A source can modulate the depth of any mod route. “Depth 1” targets mod route 1, etc.

[4] MIDI CC #: Incoming MIDI data can modulate certain parameters, and they can return the favor.

MULTI MODE

Multi mode is like having two 8-voice Leviasynths under your fingertips, plus a "Command Center" that...

- defines their note and velocity zones;
- sets their relative levels and octaves;
- decides whether one or both are affected by the controllers and Macros;
- routes the Arpeggiator to one or the other; and
- makes each module available for independent or combined access from the top panel.

SINGLE / MULTI MODE COMPARISON

The following table summarizes the main feature differences of each mode. Details are provided in the sections that follow.

Feature	Differences
Simultaneous patches	Single mode offers one 16-voice patch at a time. A Multi contains two 8-voice patches. These can be layered or split and overlapped as described in *Multi Edit mode (p. 132)*.
Number of Macros	Single mode offers up to 8 Macros. Multi mode offers up to 16 Macros (8 sets of controls, 2 Macros each). You can specify Upper, Lower, or Both per set of Macro controls.
Balance control	This control is inactive in Single mode. In Multi mode it adjusts the relative levels of the Upper and Lower parts.
Upper / Lower buttons	These buttons are inactive in Single mode. In Multi mode they select the Upper and/or Lower parts for top-panel edits.
Arpeggiator & Sequencer	Arp: The Arpeggiator is shared by the Upper and Lower parts In Multi mode. Arp settings are linked to the Upper patch. SEQ: In Single mode the tracks have access to one patch. In Multi mode they have access to either patch or both.

Mode independence

Single and Multi modes are independent in almost every way; you can switch from one mode to the other while editing and the edited patch is still there when you return. You can browse in one mode and the patch will not change in the other mode.

Note: Switching between Single and Multi modes always returns to the Home page of that mode.

Shared resources: Patch banks

A Multi patch is basically made from two Single mode patches, which means the two modes have a common denominator. As a result it is possible to share patches between the modes.

SINGLE MODE BANKS

Single mode has access to two different sets of patch banks.

- Banks A-H: You can edit these patches and save them within these banks.
- Banks M1-M5 (Upper) and M1-M5 (Lower): These are the Upper / Lower patches that reside inside the same-numbered Multis. They can be edited in Single mode, but they must be saved to banks A-H.

MULTI MODE BANKS

Multi mode is a bit more complex. Here's the basic idea:

- The Multis reside in 5 banks (M1-M5).
- A Multi holds two patches, and each of those is basically a patch from Single mode, with one exception: they share the Arpeggiator and Sequencer settings.
- From inside a Multi you can browse the Single mode patch banks (A-H) and the Upper / Lower patches of other Multis.

Note: The Upper patch determines the Arp settings, so when browsing for a new Upper patch the Arp may change and toggle on or off. The Arp settings of the Lower patch are ignored.

- As soon as a patch is selected from Single mode or another Multi it is copied into the active part (Upper or Lower) of the current Multi, after which you can edit that patch without affecting the original patch.
- When the Multi is saved, that patch becomes a component of the Multi as its Lower or Upper part.

From that point forward the copied patch inside the Multi and the original Single mode patch exist in parallel universes, so to speak: you can move, edit, or overwrite the patch in either mode without affecting the patch in the other mode.

Sequencer tracks and Arp patterns are handled differently, though. Read on...

Shared resources: Arp User phrases

The Arp phrases you create (i.e., the User phrases) are not part of a Multi the same way the Upper / Lower patches are. They reside in a dedicated memory bank, and the patches point to specific items within that bank. So if two patches share the same User phrase and it is changed in one of those places, the change affects both patches. This is true whether the patches are in Single mode or Multi mode.

For more information, see *The Arpeggiator Section (p. 99)*. To learn how to replace an Arp phrase with a Sequencer Track, see *Arp parameters: page 3 (p. 103)*.

Color schemes

One difference between Single and Multi modes is that the top panel can be different colors in Multi mode. The Access button letters are cyan when you're on the Home page of either mode, but in Multi mode they change colors when one of the parts is selected.

Mode	Active part(s)	Access button letters	Can color change?
Single		Cyan	No
Multi	Both	Cyan	No
Multi	Upper	Yellow (default)	Yes [1]
Multi	Lower	Blue (default)	Yes [1]

[1] Upper / Lower part colors are set globally for all Multis in *Display Settings (p. 157)*.

OVERVIEW OF MULTI MODE

To summarize, Single mode provides one 16-voice patch. But Multi mode provides two perfectly integrated 8-voice Leviasynths, also known as the Upper and Lower parts. Taken together, they become a Multi patch.

Parts & Patches: a primer

These terms can be confusing at first because both Single and Multi modes have "patches". But those are very different things:

- A Single mode patch contains all of the parameters needed to make one Leviasynth patch.
- A Multi mode patch contains two Leviasynth patches inside one shell (the Multi patch), with the exceptions noted earlier (the shared Arp User phrases and SEQ data).

But there's more to it than that: Sometimes in Multi mode the Upper and Lower components are called "parts" and sometimes they are called "patches." Here's how we'll use those terms:

- "Upper / Lower part" refers to parameters at the Multi level: balance, mode, keyboard zone, octave shift, controller settings, etc.
- "Upper / Lower patch" refers to the synth parameters contained by each Multi part.

What's a Multi patch?

Leviasynth holds 640 Multi patches, arranged in 5 banks of 128. Each one contains:

1. The Multi patch, with its own name, category, and color
2. Multi Edit settings such as the Dual / KeySplit mode, note and velocity ranges, crossfades, and controller settings
3. A Macro Assign page, where you can route each Macro to one or both parts
4. The Upper and Lower parts, each with a self-contained patch that is completely independent of Single mode (except as noted previously)
5. Three Sequencer tracks and one Arpeggiator, with an Arp User phrase (if selected) located in the User Phrase bank shared by all patches.

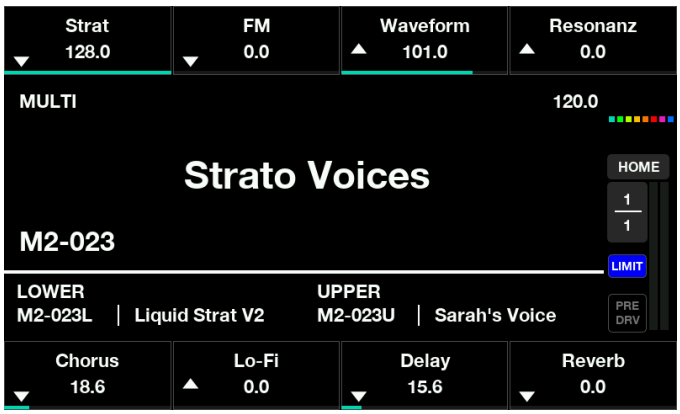
Patch selection in Multi mode

There are two levels of patch selection in Multi mode: Banks M1-M5, where Multis are selected, and the patch banks inside a Multi, where patches are selected for the Upper / Lower parts. It's important to remember that the Left / Right arrows and the Patch knob will always select a new Multi, even when one of the parts has been selected. It's different when browsing for patches for the Upper / Lower parts; then you can use the Patch knob, the Left / Right arrows, and their [SHIFT] combinations without selecting a new Multi. For more information, see *Browsing in Multi Mode (p. 133)*.

Display contents

The display is nearly identical in Single and Multi modes; for the full description, see *The display (p. 24)*. But let's do a quick review of the display on the Multi mode Home page. To get there from Single mode, press [MULTI]. If you're already in Multi mode, select Both by pressing [UPPER] and [LOWER]

at the same time. Either of these actions takes you to the Multi mode Home page.



- The middle of the display contains information about the current Multi: its name, its location (Bank and Number) and its component patches.
- The top and bottom of the display tell you what the Macro controls will do when activated. It's more complex in Multi mode, so we'll discuss it in the next section.

As in Single mode, that's what the display shows when a new Multi patch is selected...until you play a note. Then the display is replaced temporarily with either the Keyboard view or the Waveform view. To toggle between them, tap the word "KEYBOARD" or "WAVEFORM", depending on what you see. After 2 seconds of inactivity the screen returns to the Home page.

MACRO ROUTING IN MULTI MODE

When the Macro label is "Macro (1-8)" on the Home page, that means neither part uses that Macro. "BOTH" means the Macro is controlling the Upper and Lower parts, but their Macro names don't match. (Their assignments may not match either, which can be fun!)

A specific name for a Macro can mean several things:

- The Macro is controlling only the Upper or Lower part. (Hint: Look for the Up / Down arrows on the left side of the Soft button.)
- Both the Upper and Lower parts are being controlled, and their Macro assignments match (or at least their names do).

To the left of each Macro name there are arrows that point up, down, or both up and down. This tells you at a glance whether a Macro is controlling both parts or only one (and which one).

HOW TO ROUTE A MACRO

The Macro Assign page lets you route the Macro controls to a specific part or to both parts. Assuming you're already in Multi mode, here's how to do it:

1. Select Both by pressing [UPPER] and [LOWER] at the same time. This takes you to the Home page.
2. Press [MACRO ASSIGN] to enter the Macro Assign page.
3. Turn the Control knob for the specific Macro you want to route, then select Both, Upper, or Lower.
4. Save the Multi to preserve the routing assignment change.

You must select the Upper or Lower part in order to create or edit the Macros themselves. To learn how, see *Make a Macro (p. 121)*.

Multi mode controls

Multi mode has four dedicated controls:

- The Multi button switches from Single mode into Multi mode, and then cycles through the Multi Edit pages.
- The Balance control sets the relative levels of the Upper and Lower parts. It is inactive in Single mode.
- The [LOWER] and [UPPER] buttons select one of the parts for top-panel editing, and also allow you to browse the patch banks and select a patch for the selected part. For details about that see *Browsing in Multi Mode (p. 133)*.

Note that when Single mode is selected, these four controls are inactive.

Multi Edit mode

The Multi Edit pages contain parameters that let you tailor the settings for the Upper and Lower parts. These are described in the next two sections.

You can jump to Multi Edit mode from any page by holding [SHIFT] and pressing [MULTI]. If you're already in Multi mode and have Both selected, simply press the Multi button to reach the first page of parameters. Press [MULTI] again to reach the second page, then the third, after which the display cycles back to the first page, and so on.

MULTI EDIT: PAGE 1

The display contains different parameters for page 1 depending on the value of the first parameter. Use Control knob 1 to select the mode for the Multi: Dual or KeySplit. This parameter is omitted from the Page 1 tables.

Page 1: Multi mode = Dual

These parameters are visible only when the Multi mode = Dual.

Control	Name	Range	Description
2	Velocity Split	Off, On	Enables or disables Velocity Split
3	Lower Max [1]	2 – 127	Sets the upper velocity limit for the Lower part [2]
4	Upper Min [1]	1 – 126	Sets the lower velocity limit for the Upper part [2]
5	Lower Octave	-/+ 4 octaves	Transpose Lower part in octaves
6	Upper Octave	-/+ 4 octaves	Transpose Upper part in octaves
7	Lower Fade [1]	0 – 127	The velocity range required for transition to zero level
8	Upper Fade [1]	0 – 127	The velocity range required for transition to full level

[1] Visible only when Velocity Split = On

[2] Partially linked: Lower Max can not exceed Upper Min by more than one value, and vice versa. Overlap is unlimited.

Dual mode includes two types of velocity transitions: Cross-switching and crossfading.

- If Velocity Split = Off, Upper / Lower parts are triggered by all velocity values, and their relative levels can be set by the Balance control.
- If Velocity Split = On, velocity can switch between the Upper and Lower parts or crossfade between them depending on the Lo Fade and Up Fade settings. Note that the limits for the Upper low velocity and the Lower high velocity can overlap, so there can be a center "velocity window" where both parts are available.

Page 1: Multi mode = KeySplit

The following parameters are visible only when the Multi mode = KeySplit.

Control	Name	Range	Description
2	KeySplit	C1 to C7	Determines the Lower / Upper split point [1]
3	Crossfade	0 – 80	The note range required for full transition between parts, in multiples of 2
5	Lower Octave	-/+ 4 octaves	Transpose Lower part in octaves
6	Upper Octave	-/+ 4 octaves	Transpose Upper part in octaves

[1] Hold Soft button 2 and press a pad to change the KeySplit point.

KeySplit mode can have a split point that is either absolute or gradual by using the Crossfade parameter to define the width of the crossfade zone. For example:

- A setting of 0 means there is no crossfade, and the transition is instant between the Upper / Lower parts.
- A setting of 20 creates a crossfade zone 20 notes wide between the two parts (10 notes below the Key Split point and 10 notes above it). This means the Upper part takes 10 notes to fade in from zero and reaches its full level at the Key Split point, after which the Lower part takes another 10 notes to decrease from its full level to zero. A section of the onscreen keyboard becomes shaded in cyan to indicate the crossfade range.

MULTI EDIT: PAGE 2

These parameters are always visible on page 2. Edit fields 5-8 enable specific controllers to affect one or both parts within the Multi.

Control	Name	Range	Description
1	Lower Level	-36.0 / +12.0 dB	Controls Lower part level
2	Upper Level	-36.0 / +12.0 dB	Controls Upper part level
3	Balance [1]	-/+ 64.0	Controls relative levels of Lower / Upper parts
5	Lower Pan	-/+ 64.0	Sets the stereo position of the Lower part
6	Upper Pan	-/+ 64.0	Sets the stereo position of the Upper part

[1] Linked to the Balance control: Changing the value there also changes it here.

MULTI EDIT: PAGE 3

Control	Name	Range	Description
1	Sustain Pedal	Both, Upper, Lower	Sets per-part response to the sustain pedal.
2	Ribbon	Both, Upper, Lower	Lets one or both parts respond to incoming ribbon controller data.
3	Pitch Bend	Both, Upper, Lower	Lets one or both parts respond to pitch bend.
4	Mod Wheel	Both, Upper, Lower	Sets per-part response to incoming mod wheel data.
5	Arp Assign	Upper, Lower	Selects which part will respond to the Arpeggiator.

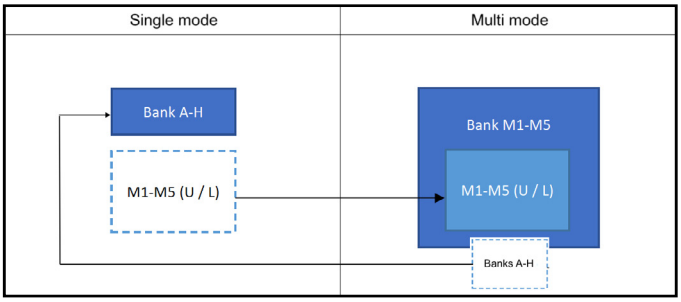
BROWSING IN MULTI MODE

Multi mode uses the Browse feature a couple of ways. You can browse the Multi patches themselves, and can also browse inside a Multi for new Upper / Lower patches. In all cases you can sort by name or number, and then filter by Bank, Category, and Sound Designer. These are described in *Using the Browser (p. 140)* The focus of this section is to explain how to browse at each level of a Multi.

Note: For all browse-related sections we'll have the Browse mode set to Sort By Patch #.

Bank / patch map

The following graphic may help to visualize the relationship between Single and Multi modes and how each handles the same patch banks differently.



Patch bank access

As shown in the graphic, Single mode has access to two sets of patch banks.

- Banks A-H contain patches you can edit and save to a location within those banks.
- Banks M1-M5 contain the Upper / Lower patch banks of Multi mode. You can edit those patches, but the edits can't be saved into banks M1-M5. They must be saved to a location in banks A-H.

The same graphic shows that Multi mode has access to three sets of patch banks:

- Banks M1-M5 contain the Multis and their Upper / Lower patch components.
- Browse banks M1-M5 from within an Upper or Lower part to audition the Upper / Lower patches of other Multis. The selected patch is copied into the active part. Any edits you make become part of that Multi when it is saved.
- Browse banks A-H from within an Upper or Lower part to audition Single mode patches. The selected patch is copied into the active part. Any edits you make can't be saved to banks A-H; they become part of the Multi when it is saved.

It is possible to copy an Upper / Lower patch into banks A-H. To do this, switch to Single mode, locate the Upper / Lower patch in the appropriate M bank, and save it from there to the desired A-H location. See *Copy Upper / Lower patch to Single mode (p. 134)* for step-by-step instructions.

Browse Multi patches

Browsing the Home page of Multi mode takes you through the Multi patch list (i.e., banks M1-M5). If you're already in Multi mode, press [UPPER] and [LOWER] at the same time to reach the Home page. Now try these techniques:

- Turn the Patch knob or press a Left / Right arrow to select an adjacent patch.
- Hold [SHIFT] and press a Left / Right arrow to jump +/- 10 patches.
- Hold [SHIFT] and turn the Patch knob to jump banks. This method jumps to patch 001 in the current or adjacent bank.
- Press [BROWSE] and scroll through the patch list by swiping up / down on the display. Tap a patch name to select it.

If you want to select a different patch for an Upper / Lower part inside a Multi, read the next section.

Browse Upper / Lower patches

Selecting a different patch for an Upper / Lower part requires an extra step. First save any edits you don't want to lose, then try this example:

1. Select any Multi.
2. Turn the Balance control fully clockwise. We'll focus on the Upper part for now.
3. Press [UPPER] to select the Upper part.
4. Press [BROWSE]. The Category and Sound Designer of the selected patch are shown in Edit fields 2 and 3.
5. First, notice the cyan highlight of the row with the current patch. The highlight indicates the patch has been selected.
6. Scroll gently through the patch list without tapping. As long as a patch is not highlighted it has not been selected.
7. Tap a patch name to select it. The new patch gains the cyan highlighting, and the other fields change as needed.
8. Use Control knob 5 to select any patch bank in Multi or Single mode. The world is yours.
9. Now try the other patch selection techniques: use the Patch knob and the Left / Right arrows, with and without holding [SHIFT]. It works the same as browsing the Single or Multi banks. Just be careful to select the Lower / Upper part before pressing [BROWSE] or else you'll select a new Multi instead.

Note that switching an Upper / Lower patch resets the octave transposition of that part to 0. Once you have the patch you want, you can set the desired octave transposition value on *Multi Edit: Page 2 (p. 133)*.

Sequencer tracks are part of the Upper patch. If you haven't saved the Multi since recording new Sequence data, be sure to save the Multi first before browsing for a new Upper patch. You may want to enable *Safe Edit (p. 154)* to prevent the accidental loss of patch data while browsing.

Copy Upper / Lower patch to Single mode

At some point you will find an Upper / Lower patch that you want to play in Single mode with full 16-voice polyphony. Let's say you want the Lower patch from Multi M3-021. Here's how to do that.

1. Switch to Single mode and choose an available location.
2. Hold [SHIFT] and turn the Patch knob to jump through Single mode patch banks until you reach patch M3-001L.
3. Still holding [SHIFT], press the Right arrow twice to reach M3-021L.
4. Press [SAVE]. The display says "Banks M1-M5 are Read-Only".
5. No problem! Keep using Control knobs 1 and 5 until you find the location you chose in step 1.
6. Give the patch a new name and category if you like, then press [SAVE] to complete the operation. The patch is now located in Single mode.

You can also use an Upper / Lower patch on its own without copying it into banks A-H. First, locate the patch in Single mode as described in steps 1-3 above, then follow the instructions in the next section.

Favorites: From both modes

Your Favorites bank can hold patches from Single mode and Multi mode side-by-side. The same methods are used for each mode:

- Select the patch, then press [BROWSE]
- Press Soft button 4 to mark the patch as a Favorite. The added "heart" icon will appear in all Browser lists.
- New Favorite patches are always added to the bottom of the Favorites list so they don't disrupt the current list order. They can be re-ordered manually.

You can access your favorite patches at any time: just press [FAVORITES] and navigate to the desired patch in the list. For details on working with the Favorites list (how to re-order them, etc.), see *Reorder, Remove (p. 146)*.

Note: MIDI Channels might change between Multi and Single patches. If a note becomes stuck on a MIDI slave, hold [SHIFT] and press [HOME] to send an All Notes Off message.

SAVE THE MULTI

The Save page in Multi mode is like the Single mode page, but shows more information. We'll cover the basics here; please see *Save the Patch (p. 142)* in the Patch Management chapter for a full description.

If Memory Protect is Off, when you press the [SAVE] button in Multi mode you'll see four names in the middle of the display, and the following parameters listed on the Soft buttons.

Control	Parameter	Range	Description
1	Select Target	5 banks x 128 patches	Scroll to select; hold [SHIFT] + scroll to jump +/-10 patches.
2	Category	(various)	Choose an existing Multi category.
3	Color	32 colors	Select LED color for the Patch knob.
4	Designer	(various)	The name of the original Sound Designer is shown. Select another as needed.
5	Bank	Multi M1-M5	Select target Multi bank.
6	New Category	(action)	Tap the button and type in a name for the new category.
7	Macro options	Return, Save, Convert	Process current Macro values (see *Macro Options (p. 143)*).
8	Bias options	Ignore, Convert	Process current Bias values (see *Bias Options (p. 144)*).

Name the Multi and Parts

The middle of the display shows the current and future names of the Multi and the Upper / Lower patches. The Target section in the middle shows you the name of the Multi patch that will be replaced.

1. Tap one of the outlined names in the middle, enter up to 16 characters with the QWERTY keypad, and tap ENTER on the keypad.
2. Repeat the process for the other two components, if desired.
3. When you have the names you want, select the Target location and bank, the category, and the options listed in the Soft buttons.

Warning: The next step will replace the current contents of that Multi location, so be sure this is what you want to do. If so, press [SAVE] and the deed is done. If not, press [EXIT]. Your edits are still there, but they have not been saved.

Note: The Upper / Lower Access button colors are not chosen here; see *Display Settings (p. 157)*.

EDIT MULTI PARTS

In Multi mode the top panel can edit the Upper patch, the Lower patch, or both patches at the same time.

Edit Upper or Lower

At some point you might want to edit one part of a Multi but not the other. For example, if there's a Step LFO sequence on both sides of a Key Split and you want to open the filter for the Upper patch but not the Lower patch, it's easy to do. Simply press [UPPER] and every synthesizer control on the top panel can now edit the Upper patch without editing the Lower patch. When you want to use the top panel to edit the Lower patch, press [LOWER].

You can keep editing the Upper and Lower patches like that until they are exactly the way you want them. But just to be on the safe side, as soon as you reach the point where you'd hate to lose what you've done so far, save the Multi. All of the edits to the Upper and Lower patches will be saved as part of the Multi, including any changes you made to the Multi itself.

PAGE MEMORY

When you switch between the Upper and Lower parts while editing their parameters, the selected part will change but the Leviasynth stays on the page you were editing. There are exceptions, though:

- Voice Scale Edit
- Macro Edit
- Mod Matrix Edit
- Algorithm Edit
- Oscillator Keyscale Edit
- LFO Step Edit
- Ribbon Scale Edit

In this case, switching between the Upper / Lower parts will relocate the page being edited to the next-higher menu. For the Mod Matrix Edit page and the Algorithm Edit page, the next-higher menu is the Home page for the selected part.

Note: Page memory in Multi mode is not the same thing as the patch-level feature *Oscillator shortcut: Page Recall (p. 37)* described in *Oscillators: the Building blocks (p. 36)*. But that feature applies at all levels of Multi mode, too.

Edit Both

Sometimes you may want to edit parameters for the entire Multi at the same time. For example, if the Multi is in Dual mode and you want to close the filter for both patches at the end of a song, it's simple: Press [UPPER] and [LOWER] to select Both parts. Now every synthesizer control on the top panel can edit the Upper and Lower patches at the same time.

Note that editing a synth parameter with Both parts selected forces each patch to have the same value for that parameter. They are not adjusted proportionately.

That can be used to your advantage, though. Let's say you're creating a Multi and you want the Upper and Lower patches to have identical reverb settings. Simply press [UPPER] and [LOWER] to select Both, then press [REVERB] to access that module. Now make the desired changes, and both the Upper and Lower patches will inherit them. This technique works on every module: [OSC 1-8], [LFO 1-5], [PRE-FX], etc.

Note that when you edit both parts the Upper values are shown, but the Lower values may be different. Any edits are applied to both parts, but the other values remain as they were for each part.

Remember: If you want independent values for a parameter, edit the Upper and Lower patches separately.

Copy / Paste in Multi mode

There's a quick way to copy settings between identical modules. The Single mode process is described in chapter 4 in the section *Copy/Paste settings (p. 35)*. But it's even more powerful in Multi mode.

For example, you can copy module settings between the Upper and Lower parts. Press [LOWER] and let's try it:

1. Press and hold [SAVE]: All Lower part modules that are potential copy sources are lit.
2. Select the copy source: Potential paste destinations begin to flash.
3. Still holding [SAVE], press [UPPER] to select the Upper part. Valid destinations continue to flash.
4. Select the paste destination, but don't release [SAVE] yet. The process will execute, the target stops flashing, and now the settings for the source and destination modules match.
5. Still holding [SAVE], note that all remaining potential paste destinations continue to flash. This enables you to continue pasting the copied data to valid destinations until it is everywhere it belongs.

To do that in the opposite direction, follow steps 1-5 with [UPPER] as the source in step 1 and [LOWER] as the destination in step 3.

If you only want to copy module settings within one part, or with Both selected, follow steps 1-5 and skip step 3.

For a list of modules that do or don't allow the copy/paste process described above, see *Modules that will (p. 35)* and *Modules that won't (p. 35)*.

MULTI MODE & THE ARPEGGIATOR

The focus of this chapter will be the way the Arp interacts with the Multi mode settings. For descriptions of the arpeggiator parameters, please refer to *The Arpeggiator Section (p. 99)*.

Overview: The Arp in Multi mode

The Upper and Lower parts share a single arpeggiator pattern and all of its settings. The Upper part provides the arpeggiator pattern, but it can be assigned to either part on Multi Edit page 3. For details, see *Multi Edit mode (p. 132)*.

Note: The [ARP ON] / [ARP LATCH] buttons affect the pattern whether Upper, Lower, or Both are selected.

The arpeggio can cross over KeySplit / Velocity Split boundaries, and the crossfade settings are applied. The Dual / KeySplit modes are described in *Multi Edit mode (p. 132)*. For more details about how the Multi responds to the Arp with various combinations of settings, read on.

QUICK VIEW: PARAMETER INTERACTIONS

Multi Edit setting	Arp: Upper	Arp: Lower
Dual mode: Velocity Split = ON	High velocity: Arp triggers Upper Low velocity: Arp does not trigger Lower; notes play normally	High velocity: Arp does not trigger Upper; notes play normally Low velocity: Arp triggers Lower
Dual mode: Velocity Split = OFF	Arp triggers Upper; Lower notes play normally	Upper notes play normally; Arp triggers Lower
Key Split mode	Arp only triggers notes played in Upper zone	Arp only triggers notes played in Lower zone

DUAL MODE (VELOCITY SPLIT = ON)

When Velocity Split is On and one of the parts is triggered by the note velocity, results depend on the ARP setting on Multi Edit page 3 (Upper or Lower).

- **Upper**: Notes played in the higher velocity range will arpeggiate the Upper part. Notes played in the lower velocity range will not trigger the arpeggiator; the Lower part may be played normally.
- **Lower**: Notes played in the lower velocity range will arpeggiate the Lower part. Notes played in the higher velocity range will not trigger the arpeggiator; the Upper part may be played normally.

DUAL MODE (VELOCITY SPLIT = OFF)

When Velocity Split is Off, results depend on the ARP setting on Multi Edit page 3 (Upper or Lower).

- **Upper**: The Arp only triggers the Upper part. The Lower zone plays normally and is not triggered by the arpeggio.
- **Lower**: The Arp only triggers the Lower part. The Upper zone plays normally and is not triggered by the arpeggio.

KEY SPLIT MODE

The arpeggio crosses the Key Split point, and can use both parts as it follows the various settings such as Mode, Octave, etc. Results depend on the ARP setting on Multi Edit page 3 (Upper or Lower). For example:

- **Upper**: The Arp only triggers notes played in the Upper zone. The Lower zone can be played normally without affecting the arpeggio.
- **Lower**: The Arp only triggers notes played in the Lower zone. The Upper zone can be played normally without affecting the arpeggio.

SHARED TEMPO

Each Multi has its own tempo, so when you're browsing for a new Upper / Lower patch, the selection does not affect the tempo. This makes it possible to audition any two Single mode patches to see how they sound together. There's a huge number of potential combinations!

As a refresher, there are two parameters that have a significant impact on the way the arpeggiator works:

- Tempo Lock (*Master Settings: page 1 (p. 154)*): This overrides the per-patch tempo settings, so every patch assumes the same tempo for its arpeggiator and other synchronized elements (LFOs, Envelopes, Delays, etc.).
- Clock Lock (*Arp parameters: page 2 (p. 101)*): With this parameter enabled the arpeggiator and other beat-synced elements will remain in perfect sync. When it is disabled the Arp can be triggered at any instant; the pattern will proceed at the master tempo but the notes will probably "flam" against the SEQ Tracks and anything with BPM = On (LFOs, Envelopes, Delay). The overall effect will be more chaotic rather than "tight".

MIDI AND MULTIS

Individual MIDI channel settings are available for Single mode and the Upper / Lower parts. These are on *MIDI Parameters: page 1 (p. 150)*. The details are there; we'll only give a basic overview here.

- The Tx and Rx MIDI channel assignments do not need to match.
- The MIDI Transmit channels are mutually exclusive; e.g., if TX Global = 1, that value is hidden for the Upper / Lower parts.
- The Upper / Lower Receive channels are also mutually exclusive; if a value is selected for the Lower part it is hidden for the Upper part, and vice versa.
- RX Global can share a MIDI Receive channel with one part or the other, but not both.
- If you want the Multi patch to respond to a single MIDI channel, send the note and control data to the RX Global channel.

MIDI Program changes and Bank select messages are always sent / received on the Global channels.

Parameter Automation

To automate the Upper / Lower parts independently from your DAW, press [MIDI] and choose the desired channels for each part. Then set Param Tx/Rx to CC or NRPN (see *MIDI Parameters: page 3 (p. 153)*, whichever works best with your DAW.

With these settings you can make independent changes to the Upper and Lower parts. But it's also possible to make identical changes to both parts as needed; just send anything but the note data to the Global channel. Then send the notes you want each part to play to their respective MIDI channels.

In summary: With the default MIDI channel settings, the Upper part responds to all MIDI data received on channels 1 + 3; the Lower part responds to all MIDI data received on channels 1 + 2.

MORE ABOUT MULTI MODE

When you enter Multi mode the capabilities of Leviasynth are more than doubled. This is truly a situation when "the whole is greater than the sum of the parts."

Initialize Multi / Upper / Lower

In addition to all the ways *The INIT button (p. 21)* can be used, the following levels of initialization are available. Starting in Multi Mode:

1. Hold [INIT] and press [UPPER] to initialize the Upper part. Press [YES] in the display or [INIT] again to confirm. If the Upper part is already selected, simply press [INIT] twice.
2. Hold [INIT] and press [LOWER] to initialize the Lower part. Press [YES] in the display or [INIT] again to confirm. If the Lower part is already selected, simply press [INIT] twice.
3. To initialize both parts, simply press [INIT] twice if you have just entered Multi mode, or if the current Multi has just been selected and no other modules have been accessed. Note that this does not initialize the Multi Edit menu, and it does not initialize the SEQ data. Those are separate processes.
4. To initialize only the Multi Edit menu, hold [INIT] and press [MULTI]. No other aspects of the Multi will change.

For a list of modules and parameters you can initialize, see *Control Combinations (p. 160)*.

Randomize Multi / Upper / Lower

The randomization methods described for *The RANDOM button (p. 22)* apply equally to the patches in the Upper and Lower parts (i.e., randomize a parameter or a Module). There's even more fun to be had in Multi mode!

GENERATE RANDOM PATCHES

You can generate a random patch for the Upper or Lower part inside a Multi, or randomize both at the same time:

1. Hold [RANDOM] and press [UPPER] to randomize the Upper part. Press [YES] in the display or [RANDOM] again to confirm.
2. Hold [RANDOM] and press [LOWER] to randomize the Lower part. Press [YES] in the display or [RANDOM] again to confirm.
3. If both [UPPER] and [LOWER] are already selected (but not held), press [RANDOM] twice to randomize both parts. But not so fast! After the first press you'll have the option to **Generate from scratch** or **Randomize from patches**, as discussed in *Random Patch generation (p. 22)*. You'll see the same options if you have just entered Multi mode, or if the current Multi has just been selected and no other modules have been accessed. Note that this does not randomize the Multi Edit menu.
4. To randomize only the Multi Edit menu, hold [RANDOM], press [MULTI], and press [YES] in the display.

RANDOMIZATION AMOUNTS

Don't forget you can set percentages to control the amount of randomization that happens; see *Percent of Randomization (p. 23)*. For a full list of modules that can be randomized, see *[RANDOM] + Button X (p. 160)*.

SELECT RANDOM PATCHES

Use these random patch selection methods when you're looking for that unexpected combination of factors that turn a Multi into magic:

1. To select a random patch for the Upper or Lower part inside the current Multi, first select [UPPER] or [LOWER], then press [BROWSE]. Next, simply hold [RANDOM] and press press one of the Left / Right arrows. A new patch will be chosen from one of the 18 patch banks, including Single and Multi modes. All other aspects of the Multi will remain unchanged.
2. To select a random Multi patch from banks M1-M5, first get to the Home page. Then hold [RANDOM] and press one of the Left / Right arrows. Press [RANDOM] again to confirm. This works from inside any module while in Multi mode.

Chord mode and Multis

You can have two different chords available for the Upper and Lower parts in Multi mode. If you're not familiar the process of creating a chord, please review the information in *Chord mode (p. 28)*.

- To create a chord for the Upper part, press [UPPER], then hold [CHORD] and play the notes you want the chord to contain.
- To create a chord for the Lower part, press [LOWER], then hold [CHORD] and play the notes you want the chord to contain.

If you want both parts to play the same chord, first press [UPPER] and [LOWER] at the same time. Then create the chord using the same process. Note that this will overwrite any per-part chords you had previously created.

VoiceMod Edit and Multis

The *VoiceMod Edit (p. 96)* list has two pages in Single mode, but only one page in Multi mode. This is true for the Upper part, the Lower part, and the Multi itself. Use the same method to access this feature:

- Press [UPPER], [LOWER], or both at the same time
  - ••Press [VOICE] four times to access page 4
- Press Soft button 7 to enter the VoiceMod menu
- Use Control knobs 1-8 to set a positive or negative value for Voices 1-8.
- Try different values for [UPPER] and [LOWER], then switch back and forth to confirm. When edited independently, the Upper / Lower values are preserved when the Multi is saved.

So what happens inside the Multi as you *Browse Upper / Lower patches (p. 134)*?

- Only the Voice 1-8 settings are used. If a Single mode patch is selected (Banks A-H) the Voice 9-16 settings are ignored.
- The Upper part Voice 1-8 settings are shown when you *Edit Both (p. 136)*, but the Lower part settings may be different. Any edits are applied to both parts, but the other settings remain as they were for each part.

For more details, see *VoiceMod Edit (p. 96)*.

CVs and Multis

The CV inputs and outputs work the same way in Single and Multi modes. This includes the Pitch, Gate, Mod, and Clock outputs and the Mod 1 / Mod 2 inputs. Please refer to *The CV / Gate Section (p. 148)* for more information.

PATCH MANAGEMENT

There's a certain amount of overlap between saving a patch and finding it later, so this chapter covers both. The concepts and operations are identical for Single mode and Multi mode, except as noted.

At first glance the Browse and Favorite pages bear a striking resemblance to one another. But the Favorites page has a different focus and functionality, so it requires a separate chapter. If that's what you're after, see *Favorites (p. 145)*.

USING THE BROWSER

Whether you're hunting for a specific patch or looking for something in a particular category, the Browser has lots of features that will help you quickly locate what you need. Among those features is the ability to designate certain patches as Favorites while browsing. Those features are covered in *Favorites (p. 145)*.

Press the [BROWSE] button and let's begin.

The Browse page

The middle of the display contains the list of patches, and the currently selected patch is highlighted. You can scroll through the list by swiping up and down, and when you see the patch you want, tap anywhere in that row to select it. That patch is highlighted, which means it is now the current patch.

The soft buttons around the display contain these features:

Control	Parameter	Range	Description
Knob 1	Sort By	Patch #, Patch Name	Sorts the patch list by Patch # or Patch Name.
Button 2	Category [1]	(view only)	Shows the category of the current patch.
Button 3	Sound Designer [1]	(view only)	Shows the sound designer of the current patch.
Button 4	Set Favorite [2]	(action)	Assigns the selected patch to the Favorites.
Knob 5	Bank	Single A-H, Multi M1U - Multi M5L Multi M1 - Multi M5	Filter patch list by bank.
Knob 6	Category	Lead, Pad, Bass, etc.	Filter patch list according to the Category selection.
Knob 7	Sound Designer	(varies)	Filter patch list according to Sound Designer selection.
Button 8	Compare [3]	(Patch select)	Compare active patch to another.

[1] These values can't be changed here. The information comes from the current patch; it only changes if a new patch is selected in the middle of the display.

[2] Patches are assigned to the Favorites banks here. Press [FAVORITE] to access and organize the Favorites list. For more information, see *Favorites (p. 145)*.

[3] The Compare button is hidden when browsing patches for the Upper / Lower parts in a Multi. See *Compare (p. 141)* for more details.

BROWSER OVERVIEW

Browsing is fairly simple. All of the main functions are on this page:

- Swipe up or down in the display to view the patch list, or use the big knob.
- Use [SHIFT] + the Left / Right arrows to skip through the list 10 patches at a time.
- Tap a patch name to select it.
- The Category and Sound Designer for the selected patch are shown in fields 2 and 3. They can't be changed here.
- Tap soft button 5 to toggle the view between the list of banks (Single mode A-H, Multi mode M1-M5, etc.) and the filtered / unfiltered patch list.
- Tap soft button 6 to toggle the view between the list of categories and the filtered / unfiltered patch list.
- Tap soft button 7 to toggle the view between the list of Sound Designers and the filtered / unfiltered patch list.
- Turn Control knob 5 to filter the list to show only patches from a specific bank (Single A-H, Multi M1U - Multi M5L).
- Turn Control knob 6 to filter the list to show only patches from a specific category.
- Turn Control knob 7 to filter the list to show

only patches from a specific sound designer.

- Tap soft button 8 to reset the patch list so it is completely unfiltered.

THINGS TO KNOW

- Patches will appear in a different order depending on the "Sort By" selection.
- The Page Up / Down buttons jump through the list 128 patches at a time. If the filtered list has <128 patches, the Page buttons will jump between the first and last patches.
- If the filtered list has >128 patches, use the Page Up / Down buttons to jump from one set of 128 patches to the next.
- The sorted / filtered list affects patch selection on the Home page. For example, if the result only has 10 patches, when you turn the Patch knob it will only let you select 10 patches. If the result has 130 patches, the first 128 are in the first bank, and the last 2 are in the second bank. So when you hold [SHIFT] and turn the Patch knob, the patch selection jumps to the first patch in the second bank and will not jump to a third bank.

Sort Methods

Patches can be sorted two ways. The patches don't move, they're just shown in a different order. This affects the Browser and the Home page: It determines the order in which the patches appear.

SORT BY PATCH

This puts the patches in order first by the Bank they occupy, then in numerical order within the Banks. The Banks are arranged like this:

- Single mode (writable): A001 to H128
- Single mode (read only): M1-001U to M5-128U M1-001L to M5-128L
- Multi mode (writable): M1-001 to M5-128

As with the Home page, hold SHIFT and turn the Patch knob to jump to the first patch in each bank (A001, B001...M1-001U, etc.).

SORT BY NAME

This option puts all patches in alphabetical order. As patches are selected the source Bank and patch number might jump around; this is because the patches are still in their original locations. They are not relocated when the Sort By option is changed.

Hold SHIFT and turn the Patch knob to jump through the list alphabetically (i.e., the first patch that starts with an 'a', then 'b', then 'c', etc.).

Filter the List

The Leviasynth browser has filtering options that will help you find the patch you are looking for very quickly. You can filter the patch list by Bank, Category, and / or Sound Designer.

Note: When one or more filtering rules is applied, Shift + patch knob always skips by the first letter of the patch name. So if there are two patches in a row that start with the same letter, it will skip the second one and jump to the next patch that starts with a different letter. They may or may not be listed in alphabetical order, depending on the combination of the Sort By and Filter By settings.

FILTER BY BANK

This filters the list so you only see the 128 patches in the selected bank. The list is specific to each mode:

- Single mode: Banks A – H, Multi M1U – Multi M5U, Multi M1L – Multi M5L
- Multi mode: Banks Multi M1 – Multi M5

FILTER BY CATEGORY

This filters the patches by their categories (Arp, Bass, FX, etc.). The list will include any categories you created yourself. They are listed in alphabetical order; use Control knob 6 to scroll the list.

Tap the display or turn the big Patch knob to select individual patches within the selected category. As they are selected the patch Bank and number might jump around a lot; this is because patches are not relocated when the list is filtered.

It's important to know that this Sort option only shows patches within the selected category. The length of the list depends on the number of patches in each category. The list might be short, or it might contain hundreds of patches.

See *Select or Create a Category (p. 143)* to learn about creating your own Categories.

FILTER BY SOUND DESIGNER

This filters the patches by Sound Designer, in alphabetical order. Use Control knob 7 to select a specific Sound Designer and audition their work. Be sure to enter your name in *System Services (p. 159)* so you can be part of this esteemed group!

RESET A FILTERED LIST

To clear all browser filters, press soft button 8 (Reset). Instantly the entire set of patches are available again for the selected mode (Single or Multi).

Compare

If no filters have been applied, the patch number shown in edit field 8 can be used to compare the current state of an edited patch with its unedited version (the default selection) or with any other Leviasynth patch within the same mode (Single or Multi).

Control knob 8 is used to scroll through the patches, which are always displayed here in their original order (by Bank and number). To jump through that list 10 patches at a time, hold [SHIFT] while turning Control knob 8.

Once the desired patch number appears in edit field 8, use soft button 8 to make the patch active. Toggle that button as often as needed to compare it to the edited patch. Note that temporary edits can be made to the comparison patch, but those edits will be lost as soon as soft button 8 is toggled back to the patch being edited.

SET OR REMOVE A FAVORITE

In Browse mode, soft button 4 is used to mark the selected patch as a Favorite, or to remove the patch from the Favorites list. This functionality is always available, regardless of any filter settings you may have selected. The button won't do anything if you haven't selected a patch in the middle of the window. though.

You can remove a patch from the Favorites list in Favorite mode too. For full details on Favorite mode, see *Working with Favorites (p. 146)*.

SAVE THE PATCH

You can save an edited patch to the current location or select a different location.

It's important to remember that the Arp User Phrases are not actually part of the patches. They are held in their own memory bank, and each patch points to a specific item within that bank. So if two patches point to Arp User phrase 10, for example, and that phrase is replaced with a new phrase, both patches will be affected. For more information, see *Arp parameters: page 3 (p. 103)*.

Patch Protection

The Memory Protect setting is On by default. So the very first time the [SAVE] button is pressed the display might show the message "Protection is On!" This must be disabled before a patch can be saved.

It's easy to find: press [SYSTEM] and Master Settings page 1 will appear. The Memory Protect feature is in edit field 4. Turn Control knob 4 or tap the soft button to deactivate or reactivate the feature. Press [EXIT] and the setting will be saved. Note: This setting is remembered when power is turned off.

If you'll be using Leviasynth somewhere a curious person might have access to it, it's probably a good idea to reactivate Memory Protect. This is a simple thing to change, and it could prevent the loss of an important patch later.

The Save page

If Protect is Off, press the [SAVE] button to open the menu. You'll see the current name (or names) in the center of the display. We'll go through the naming process in the next section; let's look at the outer sections of the display first.

Control	Parameter	Range	Description
1	Select target location	Single mode: A001 to H128 [1] Multi mode: M1-001 to M5-128	Scroll to select; [SHIFT] + scroll to jump +/- 10
2	Category	(various) [2]	Choose patch category (Arp, Bass, FX, etc.)
3	Color	32 colors	Select LED color for the Patch knob
4	Sound Designer	(various)	Sound designer's name
5	Bank	Single A-H	Jump to adjacent bank
6	(New Category)	(action)	Press to enter a new Category name
7	Macro options	Return, Save, Convert	Process current Macro values (see below)
8	Bias options	Ignore, Convert	Process current Bias control values (see below)

[1] Some patch locations are Read Only in Single mode (M1-001U to M5-128U and M1-001L to M5-128L). These are used as Upper / Lower patches in Multi mode and cannot be overwritten here. If you try to save a patch to these locations the display will show the message "Cannot save".

[2] You can select the category with Control 2, or tap the soft button and select a category from the list.

It's fairly easy to save a patch. This page presents all of the main functions; here's a summary:

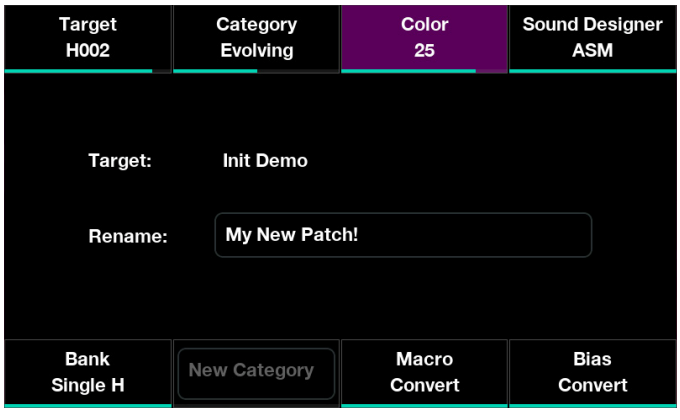
- Use Control knobs 1 and 5 to select a location and bank for the patch (the Patch knob and arrows are disabled). Use [SHIFT] + Control knob 1 to skip through the list 10 patches at a time.
- Multi mode has naming 3 fields; Single mode has one.
- Tap the appropriate field to give the patch (or patches) a name up to 16 characters long. This is described in the next section.
- Select one of the preset patch categories with Control knob 2, or tap soft button 2 to scroll through the Category list and make a selection.
- If you want to create a new category name, tap soft button 7.
- Use control knob 3 to choose one of 32 colors for the Patch knob.
- Decide what will happen with the current Macro settings when the patch is saved (descriptions below).
- Decide what will happen with the current Bias settings when the patch is saved (descriptions below).

Name the Patch

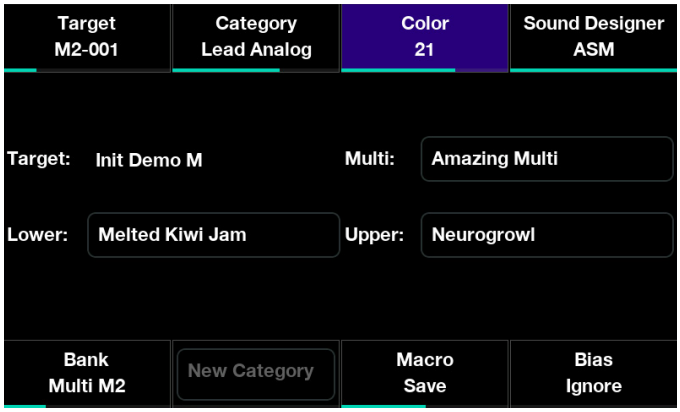
As mentioned earlier, Multi mode has naming 3 fields; Single mode has one. After you tap one of the naming fields the process is the same in both modes:

- Type in a name up to 16 characters long.
- Tap the key in the lower left corner to switch between letters and characters.
- Double-tap the shift arrow to lock the keyboard to capital letters.
- Hit Enter when you have the name you want for the patch.

SAVE: SINGLE MODE



SAVE: MULTI MODE



Select or Create a Category

Turn Control knob 2 to select one of the preset patch categories. You can also create your own category at this time:

1. Press soft button 6 (New Category)
2. Enter a name up to 16 characters in length
3. Tap Enter in the lower right corner of the on-screen keyboard

Choose a Color

As an added degree of personal touch, you can choose from 32 different colors for each patch when saving. The selection affects the LEDs under the Patch knob.

Macro Options

Control knob 7 lets you decide what will happen with the current settings of the Macro knobs and soft buttons when the patch is saved.

RETURN

This option returns all Macro knobs to zero and sets the Macro buttons to Off.

SAVE

This option preserves the positions of all Macro knobs and the status of all Macro buttons (On or Off).

CONVERT

This option converts the positions of all Macro knobs and buttons into new values for the parameters they control.

Here's what else happens with the Macro Convert option:

- After the patch is saved, the depth of all Macro knobs returns to zero and all buttons are set to Off.
- If the current relative value of a parameter exceeds that parameter's range, the value will be limited to the lowest or highest possible

value depending on its current state. The display will show a warning when this is true.

- External CV and MIDI parameters under Macro control will be returned to their zero values.

Bias Options

Control knob 8 lets you decide what will happen with the current settings of the Osc Env Level & Bias knobs when the patch is saved.

IGNORE

This option ignores the changes that have been made and leaves the original values untouched while saving all other parameters.

CONVERT

This option converts the positions of all four Bias knobs into new values for the parameters they control.

Patch Backup

Whenever you get to the point where you've created something you want to save, be it a patch or a list of Favorites, that's the time to back them up to your computer.

Our free ASM Manager application is the best way to do this: It will send or receive a single patch, several patches, a full bank, or the entire memory quickly and easily. You'll find ASM Manager at *https://www.ashunsoundmachines.com/downloads*.

FAVORITES

There's a symbiotic relationship between the [BROWSE] and [FAVORITE] buttons; their features are complementary. You can use Browse mode to find your favorite patches and tag them as such, and use Favorite mode to find, organize, and even demote the tagged patches. If you change your mind and want to tag them again, use Browse to find it again, tag it, and repeat.

FAVORITE INFO

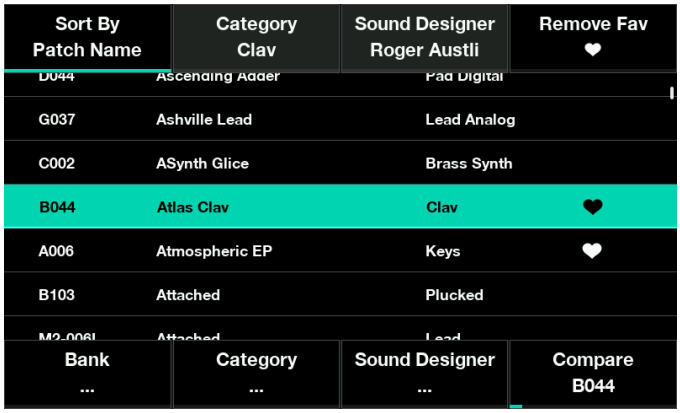
- You can add an unlimited number of patches to the Favorites list.
- The Favorites list displays Singles and Multis side-by-side, regardless of which of the two modes you're in.
- The only exception: In Multi mode, if you're browsing for a new patch for the Upper or Lower part and press [FAVORITE], the list only shows your favorite ***Single mode*** patches. That way you can easily swap a Favorite patch into a Multi part without accidentally selecting another Multi.
- When a patch is tagged as a Favorite, it is added to the bottom of the Favorites list. That way it won't disrupt the list you've already built. You can move it around inside the list later; see *Reorder, Remove (p. 146)*.
- You can also view and reorganize your Favorites list inside ASM Manager, our free utility application you can download from our website at *https://www.ashunsoundmachines.com/downloads*.

The Favorites list is just that: a list. If you replace any of those patches in your Leviasynth, they will no longer be in your Favorites list. Instead, you will see the patch that replaced your favorite patch in its original location.

TAGGING FAVORITES

The process of tagging a patch as a Favorite is covered in the Patch Management chapter, specifically in *Set or Remove a Favorite (p. 142)*. But here's a quick overview:

- Find a great patch.
- Press [BROWSE].
- Confirm that the desired patch is selected in middle of the display.
- Press soft button 4 (Set Fav).
- Repeat. (Good thing the Favorites list is unlimited!)

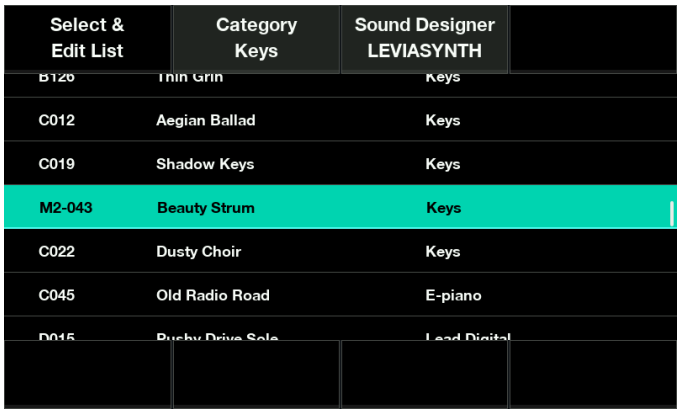


You can play any Upper / Lower patch with all 16 voices if you put it into your Favorites. Just access it from Single mode and follow the steps shown above.

Browse Favorites

Your Favorite patches can be accessed from any other page. Press [FAVORITE] and you're there. As mentioned earlier, the Favorites list can contain a mix of Single and Multi patches in any order you want. You'll know which is which by the Bank and Number labels in the list:

- Single mode patches are in the format [A-H] [001–128]
- Multi mode patches are in the format [Mx]-[001–128], where x = the Multi bank number.



You can scroll through the list to view the available patches without selecting one; just swipe up or down in the display. When you see the patch you want, tap its name in the display to select it. The cyan highlight indicates the patch that is currently selected.

You can also use the Patch knob, the Left / Right arrows, and their [SHIFT] combinations to select patches.

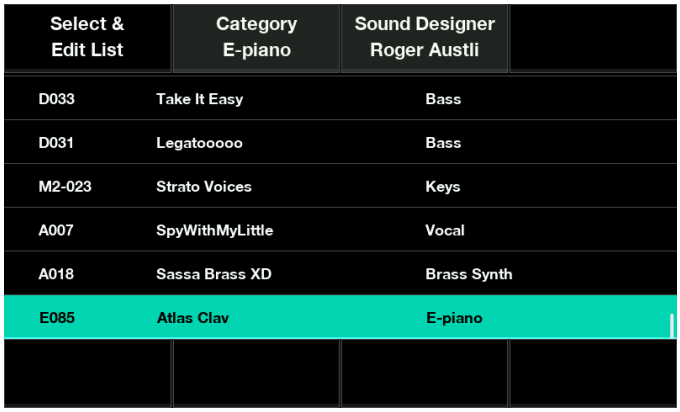
Note: The Page Up/Down arrows aren't active in Favorites mode.

Outgoing MIDI Channel numbers will change between Multi and Single patches. If a note becomes stuck on an external MIDI device, hold [SHIFT] and press [HOME] to send an All Notes Off message.

Find the Tagged Patch

When you tag a patch as a Favorite it is added at the end of the Favorites list. That's the safest place for it, really; otherwise it might be inserted in the middle of something else you had already set just the way you wanted it.

When you are ready to move the tagged patches to their rightful place in the Favorites list, press [FAVORITE]. The last patch you tagged will be at the bottom of the list.



If you have been browsing and selecting other patches since the last time you tagged one as a Favorite, none of the Favorites will be highlighted in the list. You may need to scroll to the bottom of the list and select the one you want to move.

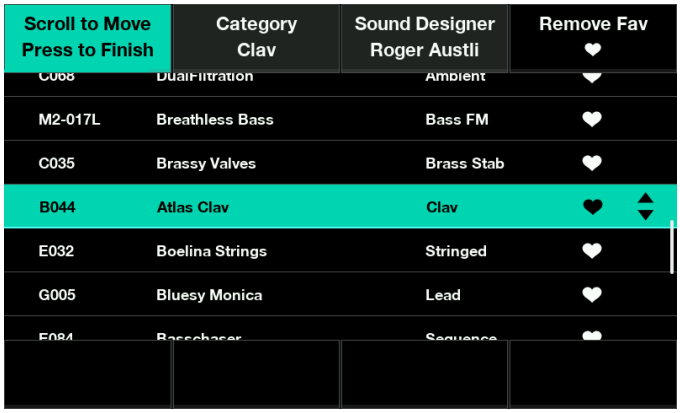
However, if that patch also happens to be the one you last selected in the browser or on the Home page, it will already be highlighted in cyan. As with the browser list, the patch that is highlighted is the one that is currently selected.

REORDER, REMOVE

Once you have some patches in your Favorites list, you can now put them in the order you want. This is extremely useful if you have certain go-to patches during a recording session, or if you are setting up a patch list for a show and need them in a specific order, etc.

Only one of the soft buttons is active in this mode: soft button 1, the one labeled Select & Edit List in the previous graphics. As in the browser, soft buttons 2 and 3 are for informational purposes only. They tell you the category and sound designer of the current patch; you can't change that information here. That is established when you *Save the Patch (p. 142)*.

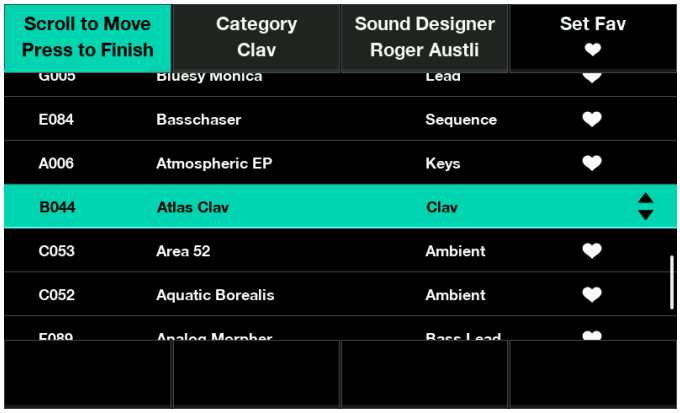
To re-order your Favorites list, press soft button 1. It becomes highlighted, and the label changes to Scroll to Move / Press to Finish, as pictured below.



Turn Control knob 1 to move the selected patch up or down the Favorites list. Each time you move

a patch up by one slot, the one that used to be above it suddenly appears below it. Likewise, if you move it down the list, the one that used to be below it suddenly appears above it.

What we didn't mention above is that while you are in the re-ordering list, a fourth soft button appears (Remove Fav). If you decide you want to remove a patch from the Favorites list, this is the one to use. Make sure the patch that has fallen out of favor is highlighted, and then press soft button 4. The heart icon will disappear next to that patch.



However, the patch you just demoted remains in the list where it was (for the time being). That way you can take advantage of the fact that the label for soft button 4 changed to Set Fave, as pictured above. Tap that row again to restore the Favorite status of that patch.

An unfavored patch will not be removed from the list until you press soft button 1 again and its label returns to Select & Edit List. This serves as a safety buffer, so you can change your mind before the decision becomes permanent. And of course, you can always browse for the removed patch again and restore its Most Favored status.

THE CV / GATE SECTION

The seven CV / Gate connectors have a longer history in the music world than MIDI does! This is how the modules of early synthesizers were connected, using cables to carry control voltages, gate triggers, and clock signals. And the resurgence of modular synths and Eurorack modules in the 21st century has brought these connection protocols back to the forefront of the music creation process for many musicians.

Leviasynth is well-stocked in this area too, with two CV inputs and three CV outputs, plus a Gate Out connector and another that transmits clock signals. Each CV / Gate connector can be configured to match the voltages and signal types of the most popular formats.

BASIC CONCEPTS

If you're new to the world of CVs and Gates, here are a few descriptions and ideas on how to put this stuff to work.

First, "CV" stands for "Control Voltage". It's a quick way to say "Use a change in this voltage value to control that device." A "gate" is something that opens and shuts, allowing the passage of electricity and preventing it, respectively. In practical terms, when a note is triggered by a pad, Leviasynth generates a CV (Pitch) and two Gate voltages (high and low, for "Note on" and "Note off").

This is done by converting digital data into analog voltages, which are then regulated by the System settings and supplied to the CV / Gate / Clock connectors. Likewise, incoming CVs are translated into digital data and supplied to Leviasynth, which taps into them via the Mod Matrix.

It's a two-way street, with the Mod Matrix as the "traffic cop": you can route the CVs from Mod 1 and Mod 2 to any mod destination, and route any mod source to Mod 1 and Mod 2, all at the direction of the Mod Matrix. In other words, the note number, velocity, and aftertouch data from the pads, the pedal activity, even incoming MIDI data can be routed to the inputs of a modular synthesizer through the CV / Gate section.

And in the other direction, just imagine: The incoming voltage could be generated by some crazy Eurorack module and used as a complex source to modulate a Leviasynth parameter. There has never been a better time to own a synth!

A FEW MORE...

CV / Gate Polyphony

CV connectors are naturally monophonic, so they work best with monophonic patches. Note that they are triggered by the Upper part in Multi mode.

For the best results set Polyphony to Mono or Unison on *Voice Parameters: page 1 (p. 89)*. To trigger the CV outs with a polyphonic patch, set Polyphony to Poly Reassign on the same page.

Note: The Unison Poly setting is a special case; it can be monophonic or polyphonic depending on the number of triggered notes. For better control of external CV devices, use Unison or one of its Lo / Hi options, or any of the Mono settings.

Clocks and Sync

The arpeggiator and sequencer can drive or be driven by external clock sources. (See *The Arpeggiator & MIDI (p. 104)* for more info). Set BPM Sync to On elsewhere too (LFOs, Envelopes, and Delay). The Clock connector in the CV / Gate section can send one of several sync rates to non-MIDI devices, as can the MIDI and USB ports. But incoming clocks must arrive via USB or MIDI. These options are set on *MIDI Parameters: page 1 (p. 150)*.

Compatibility

There are several voltage standards that companies use, so Leviasynth allows you to set the voltage ranges to match the source device. Those are defined by the CV Gate Settings in *The System Pages (p. 154)*. More later about that.

OUTPUT CONNECTORS

The output connectors (Pitch, Gate, Mod 1, Mod 2, and Clock) convert data from Leviasynth into voltages, which can then be used to trigger notes and control parameters on an external device. Note that the same voltages are sent in Single mode and Multi mode.

Each of the five output connectors has a different purpose.

Pitch

A control voltage from this connector is intended to control the pitch on an external device. The output voltage is derived from the MIDI note number that corresponds to the pad being played. This output is monophonic, so for the best results use one of the Mono or Unison / Unison Lo / Hi options. A description of each of those modes and their note priority variations is available in the *Polyphony settings (p. 89)*. The voltage ranges for this output are defined on *CV Gate Settings: Page 1 (p. 158)*.

Gate

When a pad is played, two Gate signals are generated: Gate high (note played) and Gate low (note released). The same signals are sent by the Tap Tempo button for each held note when the Tap Rhythm parameter is active on *Arp parameters: page 2 (p. 101)*.

Gate signals are normally transmitted to the same device that receives the control voltages generated by the Pitch output, and will conform to the note priority settings. Two types of gate signals are available (V-trig or S-trig); please refer to the documentation for the external device so you'll know which type to use.

The settings for this output are defined on *CV Gate Settings: Page 1 (p. 158)*.

Mod 1 and 2

These are also control voltage outputs. They can be used to modulate almost anything on a modular synth, but a common scenario is to route Mod 1 to a VCA (Voltage Controlled Amplifier) and Mod 2 to a VCF (Voltage Controlled Filter). The combined use of these two outputs and the Pitch / Gate outputs enable Leviasynth to control the entire signal path of an external monophonic device from start to finish.

The settings for these outputs are defined on *CV Mod Settings (p. 158)*.

Clock

As stated earlier, four different sync rates are available for this connector. This selection and those for three related parameters are found and explained on *CV Gate Settings: Page 2 (p. 158)*.

INPUT CONNECTORS

Inputs Mod 1 and Mod 2 are equally capable: They can be used as modulation sources to control any available destination in a Mod Matrix route. They can be set to independent voltage ranges, though, which expands their capabilities even further.

The settings for these inputs are defined on *CV Mod Settings (p. 158)*.

Esoteric Uses

These are a few ideas that will take you beyond the basics of using the CV / Gate connectors. We'll refer to Mod 1 in the following examples, but the statements apply equally to Mod 2.

CV Attentuator

You can attenuate or boost a CV signal by routing Mod In 1 to Mod Out 1 in the Mod Matrix. The amount of boost or cut is determined by the mod route Depth setting. The best results require matching the Mod 1 input and output settings on *CV Mod Settings (p. 158)*

.

CV Inverter

You can also use the CV / Gate section as a CV inverter, though this involves both Mod 1 and Mod 2. For example, use Mod In 1 as the mod source, use CV / Mod Out 2 as the mod destination, and then set Depth to a negative amount.

CVs and Arpeggios

The Leviasynth arpeggiator can be used to modulate external devices, too. When the arpeggiator plays a note it's the same as playing the pads manually: Each note sends a Pitch CV and Gate signal. Again, for the best results use a monophonic voice mode (see *Polyphony settings (p. 89)*). To use the arpeggiator with a polyphonic patch, set Polyphony to Poly Reassign on *Voice Parameters: page 1 (p. 89)*.

MIDI SETTINGS

All of the MIDI settings are global: They define the MIDI behavior for the entire unit. Controllers can be enabled and disabled for each Multi patch individually (see *Multi Edit: Page 3 (p. 133)* , but these pages define their behavior when they are active.

MIDI PARAMETERS: PAGE 1

Control	Function	Settings	Description
1	TX Global	Off, 1-16	Transmit channel for Single mode, Global operations
2	TX Lower	1-16	Transmit channel for Lower part
3	TX Upper	1-16	Transmit channel for Upper part
4	Clock Sync	Internal, USB, MIDI In	Clock source for Arp, Seq, LFOs, Envelopes, Delay FX (see *Clock Sync (p. 151)*)
5	RX Global	Omni, 1-16	Receive channel for Single/Multi modes, Global operations
6	RX Lower	Off, 1-16	Receive channel for Lower part
7	RX Upper	Off, 1-16	Receive channel for Upper part
8	MPE [1]	Off, On	Send / receive MPE data

[1] This will lock out, change or disable some system parameters (see *What is MPE? (p. 151)*).

TX and RX settings

The TX and RX Global channel assignments do not need to match. RX Global can be set to Omni, which means that in Single mode and Multi mode the Leviasynth responds to MIDI data on any channel.

The TX and RX channel assignments for the Upper / Lower parts do not need to match either.

The TX channels are mutually exclusive; for example, if TX Global = 1 that value is not available for the Upper / Lower parts; if TX Lower =2 that value cannot be selected for TX Upper; and so on.

RX Lower and RX Upper are also mutually exclusive; if a value is selected for RX Lower it cannot be selected for RX Upper, and vice versa. RX Global can share a MIDI Receive channel with RX Lower or RX Upper, but not both.

MIDI and Single mode

Single mode uses the TX and RX Global channels to send and receive note data, controller data, MIDI Bank select / Program change messages, and more. You can set Parameter TX / RX to CC or NRPN on MIDI Parameters: page 3 (see *Parameter TX / RX options (p. 153)*), whichever works best with your DAW.

Various types of MIDI data can be enabled / disabled on *MIDI Parameters: page 2 (p. 152)* and *MIDI Parameters: page 3 (p. 153)*. Remember, those settings are global, so they affect Single mode and Multi mode.

MIDI and Multi mode

All of the TX and RX parameters in the table above are related to Multi mode in one way or another. Here's what to know:

- MIDI Bank select / Program change messages are sent and received on the TX Global and RX Global channels. They are not sent by the Lower / Upper channels when a Multi is selected.
- Leviasynth responds to incoming Bank / Program changes on the RX Global, RX Lower, and RX Upper channels, whether you're in Single mode or Multi mode. They can select a Single mode patch or a Multi mode patch, depending on the received messages. See *MIDI Bank select & Program changes (p. 151)* for details.
- The Upper and Lower parts will respond to parameter and controller data that arrives on the Global channel as well as on the Upper / Lower MIDI channels. You'll also need to set Parameter Tx / Rx to CC or NRPN on MIDI Parameters: page 3 (see *Parameter TX / RX options (p. 153)*), whichever works best with your DAW. With these settings you can edit both parts at once on the Global channel, and still address them independently on their own MIDI channels (as long as the Global channel isn't set to Omni).
- If you want a Multi patch to respond to a single MIDI channel, send the data to the RX Global channel. Notes will obey the split/ crossfade settings. This lets you play a Multi from an external keyboard as if you had played it on the Leviasynth.
- If RX Lower + Up = Off, the Upper / Lower parts ignore note data, but will respond to parameter and controller data received on the Global channel.

Clock Sync

- INT RUN: Selects Leviasynth as the master tempo clock. Sync signals are sent to MIDI, USB, and the CV Clock output.
- USB: Selects the DAW as the clock master. CV Clock signals are sent to the CV Clock output at the selected rate. Tempo cannot be changed from Leviasynth.
- MIDI In: Slaves Leviasynth to incoming MIDI clock data. CV Clock signals are sent to the CV Clock output at the selected rate. Tempo cannot be changed from Leviasynth.

Note: Leviasynth cannot be synced to an incoming CV clock signal.

What is MPE?

MPE stands for "MIDI Polyphonic Expression". It's a newer MIDI protocol used mainly by alternate controllers like those by ROLI, Keith McMillen, Muse Kinetics, and more. When active, the voices of your Leviasynth break into individual channels so each note can have its own pitch bend, timbre and pressure control.

Leviasynth already supports polyphonic aftertouch, so MPE pressure is mapped automatically to Poly aftertouch. When Leviasynth has MPE set to ON, any patch that uses PolyAT as a mod source should respond automatically to pressure sent by an MPE controller.

There are also several mod sources dedicated to MPE. For a list, see *Modulation Sources (p. 127)*.

Enabling MPE will lock out, change or disable certain MIDI parameters:
- Page 1: TX Global / Lower / Upper and Rx Global / Lower / Upper = MPE Lock
- Page 2: Aftertouch TX, Ribbon PB TX, Transport Msg, and Overflow = MPE Lock

MIDI Bank select & Program changes

MIDI Bank select / Program change messages can access the Single mode patch banks, the Upper / Lower patch banks within Single mode, or switch to Multi mode and access the Multi patch banks. However, they can't select Upper / Lower patches inside a Multi.

This table shows which MIDI CC values to use to access a specific patch bank.

Mode	Patch Bank	MIDI CC (MSB)	MIDI CC (LSB)	Decimal	Hexadecimal
Single	A-H	00	00-07	1-8	00-07
Single	M1U-M5U	00	08-12	9-13	08-0C
Single	M1L-M5L	00	13-17	14-18	0D-12
Multi	M1-M5	00	18-22	19-23	13-17

Note: Each set of Bank select messages must be followed by a program change message in order to select the desired bank and patch. If you send a program change without a Bank select message, Leviasynth will select patches within the current bank.

Remember:

- MIDI Bank select / Program change messages are always sent and received on the TX / RX Global channels.
- Leviasynth responds to Bank / Program changes on the RX Global, RX Lower, and RX Upper channels.

MIDI PARAMETERS: PAGE 2

Control	Function	Settings	Description
1	Aftertouch TX	Off, Mono, Poly	Send channel, polyphonic, or no aftertouch data to USB / MIDI
3	Sustain pedal TX	Off, On	Send sustain pedal data via USB / MIDI
4	Expression pedal TX [1]	Off, On	Send expression pedal data via USB / MIDI
5	Mod wheel TX [2]	Off, On	Send mod wheel data via USB / MIDI
6	Mod wheel RX [2]	Off, On	Receive mod wheel data via USB / MIDI
7	Transport Msg	Off, TX, RX	Send or receive MIDI Start / Stop messages
8	Overflow [3]	Off, On	Connect two Leviasynth units for up to 32-voice functionality

[1] An expression pedal sends CC #11 by default, not CC #7. It can send any MIDI CC via the Mod Matrix.

[2] When enabled, the modulation wheel sends and / or receives MIDI CC #1.

[3] The Arp Seq TX setting has no effect when Overflow is set to On. Overflow must be set to Off to transmit the arpeggiator notes.

Aftertouch Transmit

Polyphonic aftertouch is an amazingly expressive tool. But it also generates a lot of control information, which can clog the MIDI data stream. Setting this to Off still allows both forms of aftertouch to be used locally but stops them from being transmitted. Mono enables Channel aftertouch values to be sent (one value for all active voices); Poly allows polyphonic aftertouch values to be sent.

Transport Messages

This setting enables the Leviasynth sequencer to send or respond to the MIDI System Real Time messages for Start and Stop.

- OFF: Ignores incoming MIDI Start / Stop messages and does not send them.
- TX: Sends out MIDI Start / Stop messages when the sequencer starts and stops.
- RX: The sequencer responds to incoming MIDI Start / Stop messages.

Overflow

Two Leviasynth models can act like one unit using Overflow mode. To use this feature, start with Leviasynth in Single mode.

It's simple: Connect a MIDI cable from the MIDI Out of Leviasynth (the "master") to the MIDI In of the other unit (the "slave"). Next, enable Overflow on the master. Connect the main audio outputs of both units to your sound system, and set good levels for each.

Now play 17 notes on Leviasynth: it plays the first 16 voices and the 17th comes from the slave. After that the slave will continue to cycle through voices 17-32.

Here are some other things to know about Overflow mode:

- If the units have identical patch banks, enable Pgm Change TX on the master and Pgm Change RX on the slave. When you select a patch on the master, the slave will select the same patch.
- Set the master Parameter TX and slave Parameter RX to NRPN. Then almost every edit made on the master will also be made on the slave.
- When both units have Mono or Unison patches selected, their voices are stacked as a single instrument (i.e., no overflow).
- If the slave doesn't have a certain Single mode patch, you can send it from the master to the slave via sys-ex (see *MIDI Parameters: page 3 (p. 153)*). Warning: This overwrites the current patch location on the slave, so be sure to select an available location on the slave first.
- Overflow only works over the 5-pin MIDI connection, not USB MIDI.

MIDI PARAMETERS: PAGE 3

Control	Function	Settings	Description
Knob 1	Parameter TX	Off, NRPN, CC [1]	Select data format sent by controls
Knob 2	Parameter RX	Off, NRPN, CC [1]	Select data format received by parameters
Knob 3	Pgm Change TX	Off, On	Send MIDI Program Change upon patch selection
Knob 4	Pgm Change RX	Off, On	Receive MIDI Program Change commands
Knob 5	Arp Seq TX	Off, On [2]	Send Arp/Seq note on/off messages to MIDI/USB
6	SysEx Port	MIDI OUT, USB	Selects which port will send SysEx data
7	SysEx Data	MIDI: Patch, This Bank	Selects which type of SysEx data to send
		USB: Patch, Patch+SEQ, This Bank, This Bank+SEQ, All Banks, All Banks+SEQ	
8	Send SysEx...	(action)	Sends selected SysEx data via MIDI Out or USB

[1] The Parameter Tx / Rx settings do not affect the transmission or reception of System MIDI controls such as Mod wheel (CC #1), Volume (CC #7), or Sustain (CC #64). For a full list of System MIDI controls, see the *MIDI CC Charts (p. 169)*.

[2] The Arp Seq TX setting has no effect when Overflow is set to On. Overflow must be set to Off to transmit the arpeggiator and sequencer notes.

Parameter TX / RX options

These parameters determine whether Leviasynth will transmit (TX) or receive (RX) 7-bit MIDI CC's or NRPNs during parameter changes. This allows for more user-friendly automation on DAWs that do not support the MIDI NRPN standard. For independent control of the Upper / Lower parts, see *MIDI and Multi mode (p. 150)* .

Note: Standard MIDI controls such as Mod wheel (CC #1), Volume (CC #7), and Sustain (CC #64) are not affected by the Parameter TX / RX settings. Some of those can be configured independently; see *MIDI Parameters: page 2 (p. 152)*.

The CC numbers for each control are listed in the *MIDI CC Charts (p. 169)*.

What's a NRPN?

NRPN stands for Non-Registered Parameter Number. It's a way of allowing higher-resolution control data to be sent and received. Implementation is not standardized, so each manufacturer uses different methods. The NRPN implementation data for Leviasynth is available at *AshunSoundMachines.com*.

Pgm Change TX / RX

These parameters determine whether Leviasynth will transmit (TX) or receive (RX) MIDI program change commands. Program change and Bank select messages are always sent and received on the TX / RX Global channels. See *MIDI Parameters: page 1 (p. 150)*.

Arp Seq TX

Set this to On if you want the arpeggiator and sequencer to transmit note on / off messages over MIDI / USB. See *The Arpeggiator & MIDI (p. 104)* for more info. If the Clock = INT on *MIDI Parameters: page 1 (p. 150)*, sync signals are sent whether Arp Seq TX is On or Off.

Select and Send SysEx

These actions transmit SysEx data via 5-pin MIDI or USB to your computer. You can send one patch or an entire bank via 5-pin MIDI to another Leviasynth if you like.

But a patch can hold a lot of data in its Sequencer tracks; for example, a full bank of 128 patches plus Sequences would take over an hour to transmit via 5-pin MIDI. That's why the options that include SEQ data are not available when the SysEx Port = MIDI Out. Those are only available when the SysEx Port = USB.

If you want to share your patches and Sequences between units, or if you simply want to reorganize them, please download our free ASM Manager application: *https://www.ashunsoundmachines.com/downloads*. It makes it easy to store your patches and Sequences to a computer and share them with another Leviasynth over USB.

THE SYSTEM PAGES

The System Pages are home to the global settings for Leviasynth. They define the way the unit behaves in Single and Multi modes, how it interacts with Eurorack systems, and how the keys respond to your playing, among other things.

OPERATIONAL NOTES

Navigation

Press [SYSTEM] to access the System parameters. The center of the display has 8 buttons, which are labeled to help you find the page you need quickly.

There are three ways to navigate the System pages:

- Press the center buttons.
- To access the next or previous page, use the Page Down / Up arrows.
- Cycle through the pages by pressing [SYSTEM] repeatedly.

Two of the center buttons have 2 pages each: Master Settings and CV Gate Settings. When these are selected the display also shows "Page 1/2" or "Page 2/2" between the first row of soft buttons and the center buttons. You can press that center button to cycle between the two pages. You can also use the Page Down / Up arrows or the [SYSTEM] button to access them as you normally would.

Note: The Bias knobs and the INIT / RANDOM buttons are deactivated in the System pages.

Access, Action

- Some fields have soft buttons that execute a function, such as the Factory Reset. These are indicated by the word (action) in the parameter tables.
- Some pages have access buttons that open another page. These are indicated by the word (access) in the parameter tables.

You can toggle a binary parameter between its two settings by pressing its Soft Button. For example, on Master Settings page 1 you can tap Soft Button 4 to toggle Memory Protect from OFF to ON and vice versa.

MASTER SETTINGS: PAGE 1

Knob	Function	Range	Description
1	Transpose	- / +11 semitones	Transpose keyboard chromatically.
2	Tuning	380 to 500 Hz	Sets center tuning frequency.
3	Safe Edit	Off, On	Prevents accidental loss of edited patch or sequence.
4	Memory Protect	Off, On	Prevents overwriting of patches.
5	Auto Power	15 min / 1 hour / 2 hour / 4 hour / 6 hour / 8 hour / Never	Period of inactivity until automatic power off.
6	Local	Off, On [1]	Disconnect pads from internal engine.
7	Tempo Lock	Off, On	Selects Global tempo or per-patch tempo.
8	Master Limiter	Off, On	Toggles the Limiter off and on.

[1] The Local On / Off setting is remembered when power is turned off.

Safe Edit

With this parameter set to On, if you try to select another patch before saving an edited patch, a message will ask for confirmation first. This is also a safeguard against losing unsaved Tracks, because the Sequence data is part of each patch. If a Macro control was the only thing changed, the confirmation message will not be displayed.

Note: This does not prevent Leviasynth from responding to MIDI program changes.

Auto Power

This setting lets you decide if you want Leviasynth to shut itself off automatically if it hasn't been used for a while. The default setting is "Never", to prevent surprises as you're taking the stage for a performance, having not touched the unit since the sound check earlier that day.

Note: If Leviasynth does power down automatically, the physical switch does not move; it remains in the On position. You'll need to toggle the switch off and back on to power up again.

Local

When working with a DAW, setting Local to Off can prevent a MIDI loop. Most DAWs have the ability to prevent this also.

The display will alert you when Local = Off with a message during power-up and on the Home page.

Tempo Lock

Each patch stores its own Tempo setting. Setting Tempo Lock to On enables the tempo to remain the same while selecting patches.

Master Limiter

When the Limiter is toggled On, the [LIMIT] button replaces the [CLIP] button in the Info section of the display. The [CLIP / LIMIT] button is located above the Pre-Drive indicator on almost every page except the System pages. The Limiter can be toggled on and off on this page, or by pressing the [CLIP / LIMIT] button on any page where it is visible.

The Limiter is like a compressor with a very high ratio. If the master output signal level reaches the threshold while the Limiter is active, it stops the signal from passing the threshold in order to prevent or reduce clipping.

When the Limiter kicks in, a blue bar will expand from the top of the VU meter downward to reflect the amount of limiting being done. If you still hear clipping with the Limiter active, you may want to visit the VCA page and adjust the signal at an earlier stage. See *The VCA Module (p. 70)* for more information.

MASTER SETTINGS: PAGE 2

Control	Function	Settings	Description
Soft button 1	Microtuning Menu...	(access)	Opens Microtuning Menu.

Microtuning Menu

The microtuning scale is selected on page 4 of *The Voice Module (p. 89)*. in this section we'll describe how to send and receive them.

After accessing the microtuning menu the following options are available:

Control	Parameter	Range	Description
Knob 1	Scale select	1–32	Selects the Microtuning scale location.
2 (view only)	Scale name	1–16 characters	Definable with third-party software (Scala, etc.).
Button 3	Receive Scale	(action)	Puts Leviasynth into Scale Receive mode.
Button 4	Send Scale	(action)	Press to send selected scale sys-ex from Leviasynth via MIDI / USB.

SCALE SELECT

Use this field to choose a location to receive the new scale or to send its scale via MIDI / USB.

SCALE NAME

The scale name is shown in this field. It cannot be edited here. When creating your own scales, be sure to set the scale name in the third-party software before exporting it as an MTS file (MIDI Tuning Standard). In Scala, for example, the name is taken from the Description section for the scale, not from the file name. Note that Leviasynth only uses the first 16 characters in the name.

RECEIVE SCALE

Press soft button 3 to put Leviasynth into SysEx waiting mode. At this point, you can send the SysEx scale file from your computer.

SEND SCALE

Press soft button 4 to send your scale via sys-ex.

PAD SETTINGS

Control	Function	Settings	Description
1	Velocity	On, Fix 60 / 80 / 100 / 110 / 127	Select velocity response or fixed value.
2	Velocity Curve	Very Soft, Soft, Medium, Hard, Very Hard, NeoSoft, Neo, NeoHard	Select curve for velocity response.
3	Aftertouch Delay	0-400 ms	(see description)

4	Aftertouch Fade	0-400 ms	(see description)
5	Aftertouch [1]	On, Off	Toggle aftertouch sensitivity.
6	Aftertouch Curve	Softer through Harder (6 settings)	Select aftertouch response.
7	Aftertouch Offset	- 4 to + 4	(see description)
8	Aftertouch Release	0-400 ms	(see description)

[1] This will also disable or enable polyphonic aftertouch.

Velocity settings

Velocity: To disable velocity sensitivity for the pads, select a fixed value (Fix 60, Fix 80, etc.). This only affects local response and outgoing MIDI; incoming velocity response is unaffected.

Velocity Curve: Defines the amount of force needed to reach maximum velocity, and also the curve from zero to maximum. The Very Soft through Very Hard curves vary from exponential to logarithmic. Neo curves are based on a new velocity calculation that allows for a more sophisticated response.

Aftertouch settings

- Aftertouch Delay: The time that transpires between note on and the onset of aftertouch.
- Aftertouch Fade: The time it takes to ramp aftertouch to its current value from 0.
- Aftertouch Curve: Determines the amount of force required to reach maximum aftertouch values.
- Aftertouch Offset: Reduces the dynamic range of the aftertouch. Positive values set a higher minimum point, so it takes more pressure to start the aftertouch. Negative values set a lower maximum point, so it takes less pressure to reach the maximum aftertouch value.
- Aftertouch Release: More like a compressor than an envelope, this applies to all upward movements. This can help avoid unwanted modulation "wobble" while pressure is applied, and it can sustain even after note off.

CONTROL SETTINGS

Control knob	Function	Settings	Description
1	Knob Mode	Absolute, Pickup, Scale	How Variable knobs edit values when moved.
2	Knob Speed	Slow, Medium, Fast	Sets soft knob response speed.
3	Macro Button	Toggle, Trigger, Switch, Reset	Determines behavior of Macro buttons.
4	Fx Bypass Menu	(access)	Global bypass of specific FX modules in all patches.
5	Sustain Pedal Polarity	+, -, Auto	Set polarity of sustain pedal or detect on power-up.
6	Exp Pedal Polarity	+, -	Set polarity of expression pedal.
7	Exp Pedal Set...	(access)	Calibrate expression pedal.
8	Exp Pedal Curve	Log, Lin, Sigmoid, Exp	Select response curve for expression pedal.

Knob Mode

This setting governs the response of the encoders and knobs.

- Absolute: The parameter value jumps to the physical position of the knob.
- Pickup: The knob must pass through the parameter value before an edit will happen.
- Scale: Parameter value edits begin from the current knob position; the remaining throw of the knob covers the remaining range of the parameter. After the knob reaches its minimum or maximum position the parameter value range conforms to the physical position of the knob (see Absolute).

Knob Speed

This determines the response speed of the Control knobs only. It also affects the finer [SHIFT] + scroll movements. With a setting of Slow a full turn is required to cover the full parameter range; with a setting of Fast it takes less than half a turn, which can also sacrifice parameter resolution.

Macro Button

These settings are described in the *Macro Button Response (p. 123)* section of the Mastering the Macros chapter.

FX Bypass Menu

There are times when you may need to defeat one or more of the active effects for all patches. Some effects are integral to the character of a patch, such as flange or distortion. On the other hand, some effects are useful for setting a creative mood, but are less desirable when tracking parts in a studio. For example, you might want to disable the reverb but keep the delay for its rhythmic contributions. However, if you want to change the song tempo later, a recorded delay could be problematic.

For maximum flexibility, Leviasynth has the ability to enable and disable the Pre-FX, Post-FX, Delay, and / or Reverb as needed. These settings are global; i.e., they affect all patches the same way.

- Press [SYSTEM] and select Control Settings in the center of the display.
- Press soft button 4 to enter the FxBypass Menu.
- Use Control knobs 1-4 to enable or disable the desired FX module. Their LED buttons toggle off and on to indicate the settings.

Control knob	Parameter	Settings
1	Pre-FX	On, Off [1]
2	Delay	On, Off
3	Reverb	On, Off
4	Post-FX	On, Off [1]

[1] A Pre- / Post-FX module can have its FX Type set to Bypass. That setting only affects the current patch, not all patches, so the module LED stays lit. See *Pre- and Post-FX (p. 85)* in the Effects chapter for more information.

Expression Pedal Setup

Press soft button 7 to access the pedal calibration page. The display will prompt you to sweep the expression pedal through its full range.

DISPLAY SETTINGS

Control knob	Function	Range	Description
1	Oscilloscope	Off, On	Toggles waveform animation in display.
2	Contrast	0 to 127	Sets contrast for display.
3	Light show	Off, 10 / 30 seconds, 1 / 5 / 15 / 30 minutes	Sets timeout period for onset of light show.
4	LED Dim	Off, On	Dims all LEDs except the Patch knob.
5	Patch Dim	Off, Dim 1-4, Kill	Controls the Patch knob LED ring.
7	Lower Color	1–32	LED color for Lower parts.
8	Upper Color	1–32	LED color for Lower parts.

LED AND PATCH DIM

The LED levels change as each value is selected so you can set the proper lighting for the current environment.

LOWER / UPPER COLOR

These two settings let you customize what the color will be for the Lower and Upper part select buttons. The selected color will be applied to all of the Access module buttons when one of these parts is selected. The color options are identical to those offered in *The Save page (p. 142)*.

CV GATE SETTINGS: PAGE 1

These settings are compatible with most modular synthesizer equipment. Please refer to the specifications of other devices and match those settings on Leviasynth.

Control knob	Function	Range
1	Control Voltage Range [1]	Octave (0-10V, -/+5V); Hz 0-10V; Octave 1.2V
2	Reference note [2]	C-1 to G9
3	Control Voltage Offset	-99 cents to +99 cents
5	Gate Type	V-trig, S-trig
6	Gate Volt	3V, 5V, 10V

[1] Octave = Volt per octave, Hz = Hz / Volt

[2] 1V reference note for Hz / V, or lowest V reference note for V / Oct.

CV GATE SETTINGS: PAGE 2

These are the settings required to synchronize with most non-MIDI devices. Please refer to the specifications of other devices and match those settings on Leviasynth.

Control knob	Function	Range
1	Clock Control Voltage	3V, 5V, 10V
2	Clock Rate	1 PPS, 2 PPQ, 24 PPQ, 48 PPQ
3	Clock Division	Off, 1/2, 2, 4
4	Clock Offset	-100ms to +100ms

PPS (Pulse Per Step) sends a single cycle of the clock output with every step of the Sequencer / Arpeggiator, or every time [TAP TEMPO] is pressed when the Tap Rhythm parameter is active on Arp Edit page 2. PPS works well with modular synths:

The clock output behaves a bit like a Gate output (with Tap Rhythm) or even as a square wave LFO.

PPQ stands for Pulse Per Quarter note. Between these three options and the Clock Division value it is possible to generate a wide variety of clock signals from 1/2 PPQ to 96 PPQ.

Clock Division

This subdivides or multiplies the clock output: 1/2 divides by 0.5, so the clock speeds up (to double tempo); 2 and 4 slow down the clock to half tempo and one-quarter tempo, respectively. A setting of Off = no change.

CV MOD SETTINGS

These settings enable the use of devices with different CV standards. For example, Input / Output Mod 1 can be set to +/- 5V while Input / Output Mod 2 are set to 0-10V. The Offset ranges are independent in each direction, which allows the voltages to be fine-tuned to compensate for the idiosyncrasies of individual devices.

Control knob	Function	Range
1	Mod In 1 Range	+/- 5V, 0-10V, 0-5V, 0-1V
2	Mod In 2 Range	+/- 5V, 0-10V, 0-5V, 0-1V
3	Mod Out 1 Range	+/- 5V, 0-10V, 0-5V, 0-1V
4	Mod Out 2 Range	+/- 5V, 0-10V, 0-5V, 0-1V
5	Mod In 1 Offset	+/- 3.0V
6	Mod In 2 Offset	+/- 3.0V
7	Mod Out 1 Offset	+/- 3.0V
8	Mod Out 2 Offset	+/- 3.0V

The allowable range for input /output voltages is from -5V to 10V. If an input or output value attempts to exceed the range, it will be clipped automatically to the lowest or highest possible value depending on which value has been exceeded.

CALIBRATION

Soft button	Function	Range	Description
3	Calibrate VCF	(action)	Automatically calibrate the analog filters.

Calibrate VCF

Leviasynth has 16 voices, with an analog filter for each voice. Analog filters tend to drift slightly; that's why we love them! But if they need to be recalibrated, press soft button 3 and it will happen automatically.

After Leviasynth powers up for the first time, give the analog filters 1/2 hour to warm up and then run the Calibrate VCF routine.

SYSTEM SERVICES

Soft button	Function	Description	Range
1	User Name	(action)	Press the button and enter your name with the QWERTY keyboard.
3	Self Test	(action)	Press the button and all LEDs and displays are lit at maximum for visual inspection. Press [EXIT] to stop.
4	Factory Reset	(action)	Press Yes to confirm or No to cancel. Resets all System parameters to default values. This action does not erase the patch banks.
5	Current patch as INIT	(action)	Press this to designate the current Single mode patch as your default starting point for patch creation.
6	FW Version	(display only)	Shows the current firmware version. Please include this if you need to contact Technical Support.
7	Serial Number	(display only)	Shows the serial number of your unit. Please include this if you need to contact Technical Support.
8	SYS Version	(display only)	Shows the current system version. Please include this if you need to contact Technical Support.

Please always install the latest firmware in your Leviasynth so you can take advantage of new features as they are added! Visit *https://www.ashunsoundmachines.com* for the latest news, patch banks, and updates for your Leviasynth and ASM Manager.

[INIT] + BUTTON X

The following modules can be initialized by holding [INIT] and pressing the Access button.

Note: For the sake of legibility, Oscillator Group Edit is abbreviated to OGE throughout this chapter.

Buttons			
Algo Edit	OSC 1-8	OGE Decay	Macro Trk Edit
Analog Filter	OGE Mode	OGE Sustain	VCA
Arp On	OGE Wave	OGE Release	Voice
Chord	OGE Pitch	Post-FX	–
Delay	OGE Fine	Pre-FX	–
Digital Filter	OGE Feedback	Reverb	–
ENV 1-5	OGE Level	SEQ Record	–
LFO 1-5	OGE Delay	Trk Params	–
Macro Assign	OGE Attack	Trk 1 Edit	–
Mod Matrix	OGE Hold	Trk 2 Edit	–

Hold [INIT] and press [Multi], [Lower], or [Upper] to initialize those items. Note that [INIT] + [Multi] affects only the Multi Edit mode parameters (Multi Mode, Balance, Octave settings, etc.), not the Upper / Lower parts.

[INIT] + ENCODER X

Hold [INIT] and touch one of these endless encoders to reset it to its default value.

Encoder Group	**Encoder**
Master Control	Macro 1-8
Osc Env Level & Bias	Env Level, Attack, Decay, Release

[RANDOM] + BUTTON X

The following modules can be randomized by holding [RANDOM] and pressing the Access button.

Buttons			
Algo Edit	OGE Mode	OGE Sustain	VCA
Analog Filter	OGE Wave	OGE Release	Voice
Arp On	OGE Pitch	Post-FX	< or > (select random patch)
Delay	OGE Fine	Pre-FX	–
Digital Filter	OGE Feedback	Reverb	–
ENV 1-5	OGE Level	SEQ Record	–
LFO 1-5	OGE Delay	Trk Params [1]	–
Macro Assign	OGE Attack	Trk 1 Edit	–
Mod Matrix	OGE Hold	Trk 2 Edit	–
OSC 1-8	OGE Decay	Macro Trk Edit	–

[1] This randomizes the parameters for all Tracks, but does not randomize the *SEQ Settings (p. 111)*.

Hold [RANDOM] and press [Multi], [Lower], or [Upper] to randomize those items. Note that [RANDOM] + [Multi] affects only the Multi parameters (Multi Mode, Balance, Octave settings, etc.), not the Upper / Lower parts. Press [RANDOM] twice from the Multi Home page to generate an entirely randomized Multi.

[SHIFT] + BUTTON X

These shortcuts are available by holding [SHIFT] and pressing the button.

Button	Function
Arp On	Access Arp Edit page.
Arp Latch	Sustain Hold toggle.
Chord	Access Chord Edit page.
ENV 1-5	Select the most recently used ENV page on the target envelope. This also works when selecting ENV X after editing a setting in a different module.
Home	Send All Notes Off command to engine, USB, and MIDI. Reset MIDI CC #7. Turn off all voices and end all Envelopes. Set all Gates to Off.
LFO 1-5	Select the most recently used LFO page on the target LFO. This also works when selecting LFO X after editing a setting in a different module.
Multi	Access Multi Edit page.
Octave Down	Jump to lowest octave (-4).
Octave Up	Jump to highest octave (+4).
Osc 1-8	Select the most recently used Osc page on the target oscillator. This also works when selecting Osc X after editing a setting in a different module.
Page Down	Jump to bottom page.
Page Up	Jump to top page.
SEQ Play	Access SEQ Edit page. All SEQ-related buttons are here: Track Parameters, Track Settings, Track X Edit, Track X On, Tap Tempo, and Metronome.
SEQ Record	Enter Step Record mode for the armed SEQ Track (Track 1 or 2).
Tap Tempo	Enable / disable the Metronome. This is an on-screen button inside the SEQ Edit page.
Trk Params	Access SEQ settings. This is an on-screen button inside the SEQ Edit page.
<	Decrease patch number by -10.
>	Increase patch number by +10.

[SHIFT] + CONTROL KNOB X

The following value jumps are available by holding [SHIFT] and turning the appropriate Control knob.

Location	Control Knob	Behavior
Algo Edit	Algo Select	Increase scroll speed through list.
Arp	Tempo	Fine-tune by 0.1.
Arp	Length	Jump to the closest special value [1, 2, 4, 8, 16, 32].
Arp	Phrase	Jump to the first phrase in each group (Preset, User).
Browse	Patch	Jump by 10.
Browse	Compare	Jump by 10.
Patch	Save Patch #	Jump by 10.
Voice	Pitchbend	Jump to the closest special value [0, 2, 4, 5, 7, 12, 24].
Macro Assign	Edit Destination Module	Jump to the closest first group of each type.
Mod Matrix	Source	Jump to the closest first modulator of each group.
Mod Matrix	Destination Module	Jump to the closest first group of each type.
Trk Params	Length	Select non-standard track lengths (1-7, 9-15, 17-23, etc.)
Osc X	Wave	Jump to the closest first wave of each group.

Osc X	Semi	Jump to the closest special value [-36, -24, -12, 0, 12, 24, 36].
Osc X	Ratio	Jump to the closest special value [0.25, 0.5, 1, 2, 3, 4, 5, 6, 7... 64].

[SHIFT] + SOFT BUTTON (SPECIAL OPS)

Location	Soft Button	Behavior
Home	Macro	Depends on settings on the System Control Settings page. See *Macro Button Response (p. 123)*.
Reverb	Time	Toggle activation of Time Freeze.
Envelope	Delay, Attack, Hold, Decay, Release	Duration of holding the soft button determines the time value.
LFO	Rate, Delay, Fade In	Duration of holding the soft button determines the time value.
Trk Params	Mode	If Mode = Random Once, this prints the current random order to the track and sets Mode to Forward.
Track edit	Step X	During playback: restart track from that step on next step division Playback stopped: Trigger that step

PRESET STANDARD SCALES

Below are the notes of each preset scale relative to the key of C. An "x" means that note is in the scale; a dash means it is not.

Scale	C	C♯/D♭	D	D♯/E♭	E	F	F♯/G♭	G	G♯/A♭	A	A♯/B♭	B
Chromatic	x	x	x	x	x	x	x	x	x	x	x	x
Major	x	-	x	-	x	x	-	x	-	x	-	x
BeBop Maj	x	-	x	-	x	x	-	x	x	x	-	x
BeBop	x	-	x	-	x	x	-	x	-	x	x	x
Mixolydian	x	-	x	-	x	x	-	x	-	x	x	-
Harmonic Major	x	-	x	-	x	x	-	x	x	-	-	x
Lydian	x	-	x	-	x	-	x	x	-	x	-	x
Lydian Aug	x	-	x	-	x	-	x	-	x	x	-	x
Acoustic	x	-	x	-	x	-	x	x	-	x	x	-
Pentatonic Maj	x	-	x	-	x	-	-	x	-	x	-	-
Locrian Maj	x	-	x	-	x	x	x	-	x	-	x	-
Prometheus	x	-	x	-	x	-	x	-	-	x	x	-
Whole Tone	x	-	x	-	x	-	x	-	x	-	x	-
Melodic Minor [1]	x	-	x	x	-	x	-	x	x	x	x	x
Half Diminished	x	-	x	x	-	x	x	-	x	-	x	-
Aeolian	x	-	x	x	-	x	-	x	x	-	x	-
Dorian	x	-	x	x	-	x	-	x	-	x	x	-
Harmonic Minor	x	-	x	x	-	x	-	x	x	-	-	x
Algerian	x	-	x	x	-	x	x	x	x	-	-	x
Gypsy	x	-	x	x	-	-	x	x	x	-	x	-
Hungarian	x	-	x	x	-	-	x	x	x	-	-	x
Ukranian	x	-	x	x	-	-	x	x	-	x	x	-
Dim. Whole Tone	x	x	-	x	x	-	x	-	x	-	x	-
Locrian	x	x	-	x	-	x	x	-	x	-	x	-
Neapolitan Major	x	x	-	x	-	x	-	x	-	x	-	x
Neapolitan Minor	x	x	-	x	-	x	-	x	x	-	-	x
Phrygian	x	x	-	x	-	x	-	x	x	-	x	-

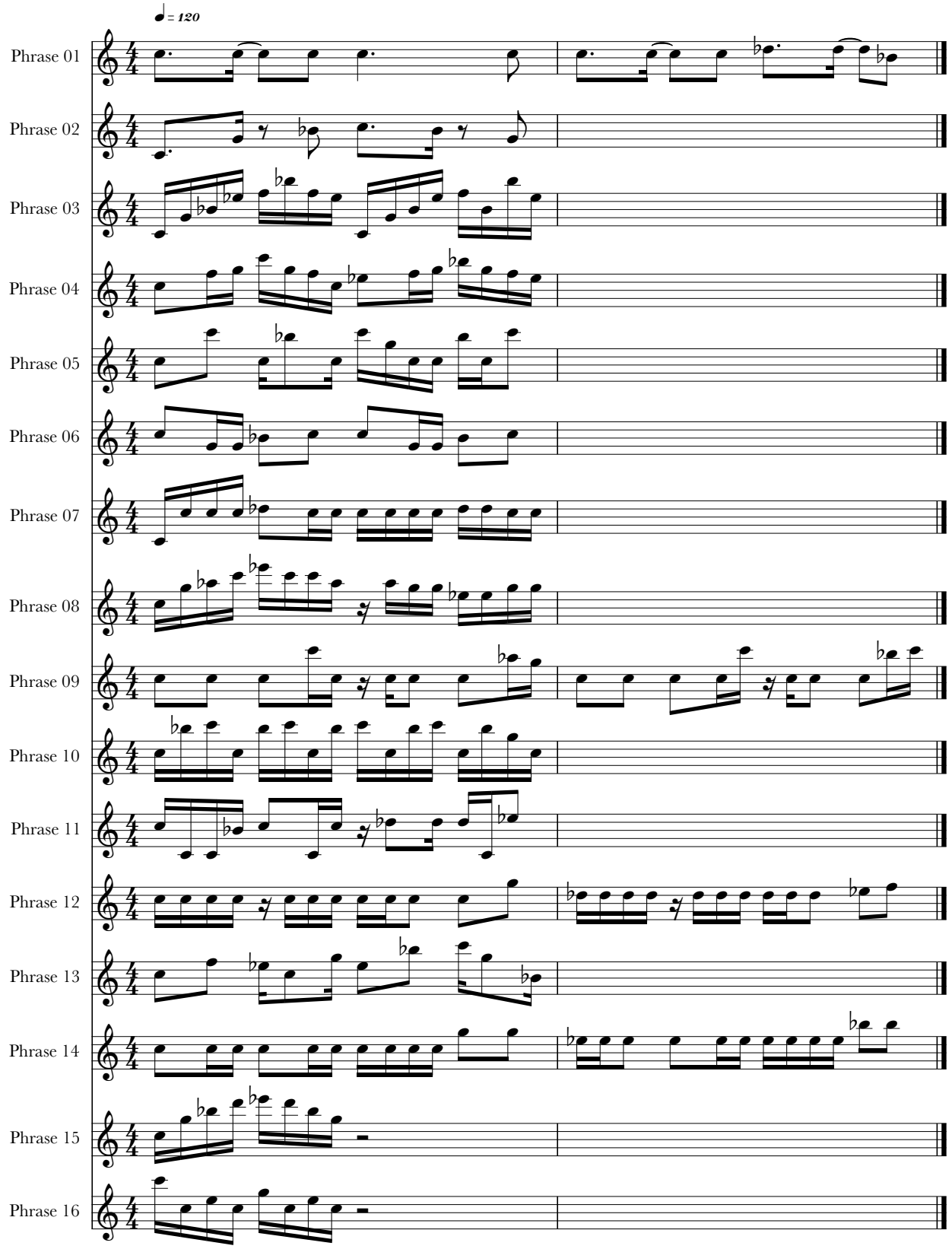
Scale	C	C♯/D♭	D	D♯/E♭	E	F	F♯/G♭	G	G♯/A♭	A	A♯/B♭	B
Flamenco	x	x	-	-	x	x	-	x	x	-	-	x
Persian	x	x	-	-	x	x	x	-	x	-	-	x
Phrygian Dominant	x	x	-	-	x	x	-	x	x	-	x	-
Enigmatic	x	x	-	-	x	-	x	-	x	-	x	x
Tritone	x	x	-	-	x	-	x	x	-	-	x	-
In	x	x	-	-	-	x	-	x	x	-	-	-
Insen	x	x	-	-	-	x	-	x	-	-	x	-
Augmented	x	-	-	x	x	-	-	x	x	-	-	x
Blues	x	-	-	x	-	x	x	x	-	-	x	-
Pentatonic Minor	x	-	-	x	-	x	-	x	-	-	x	-
Hirajoshi	x	-	-	-	x	-	x	x	-	-	-	x

PRESET MICROTUNING SCALES

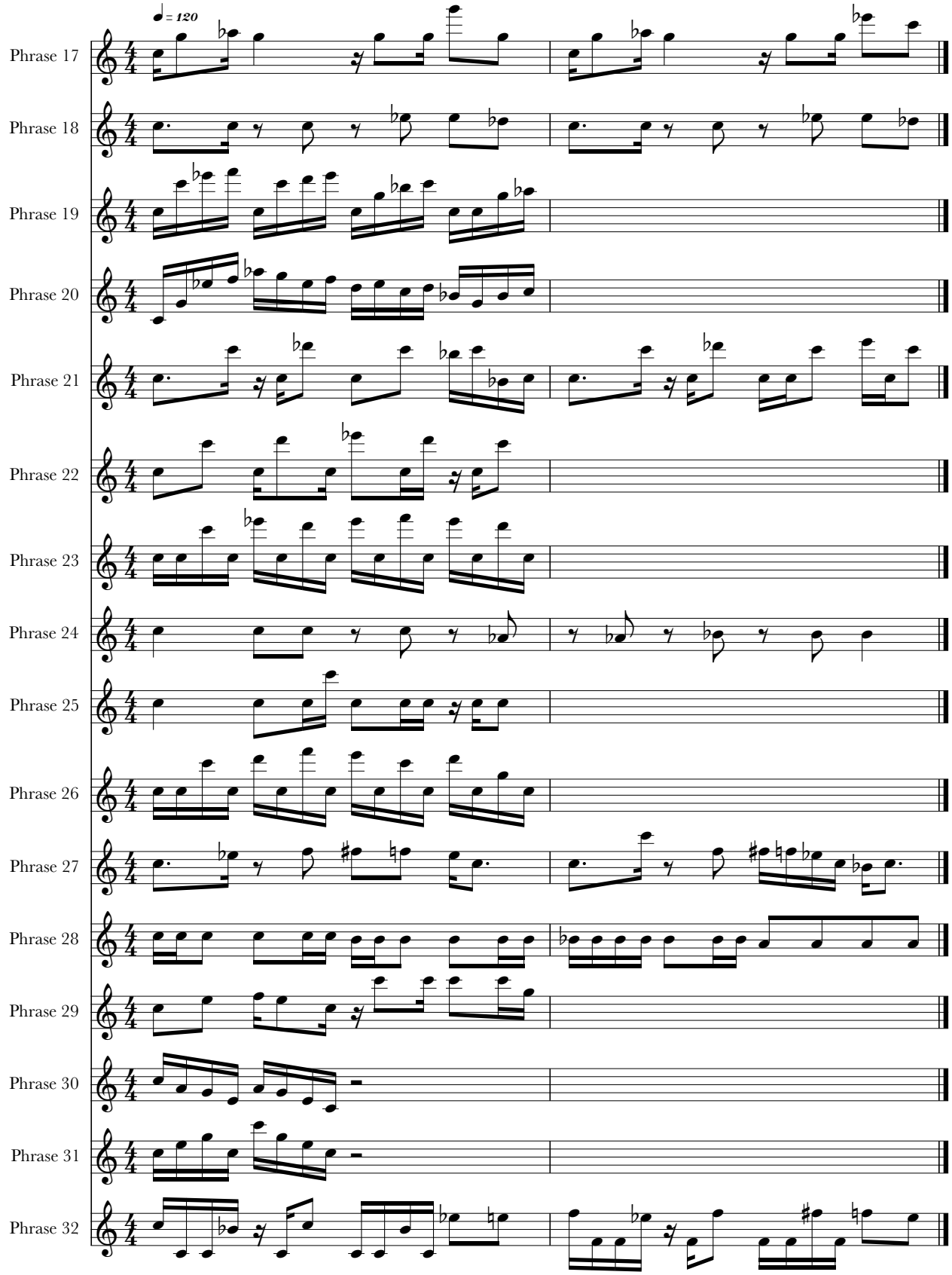
Micro scale #	Name	Scale	Name
1	1/4 Tone	17	Diaphonic 12-tone
2	19 Tone	18	Eikosany 1 3-11
3	31 Tone	19	Greek Aeolic
4	Al-Farabi SynChrom	20	H. Partch 43-note
5	Arabic 12-tone	21	Harmonic A 1-60
6	Archytas Chromatic	22	Hexany 1 3 5 9
7	Archytas Enharmonic	23	Hexany 1 3 7 11
8	Belafon Singapore	24	Hexany 13 11 13
9	Belafon W. Africa	25	Indian Raga
10	Bendeler Well-Tempered	26	Japanese Koto
11	Bohlen 11-tone	27	Just Major C
12	Chinese 300 B.C.	28	Just Minor C
13	Chinese DiziFlute	29	Mean tone C
14	Crysanthos Byzantine	30	Pelog / Slendro
15	Dekany 1 3 5 11-3	31	Sk8board 17-65 Tun
16	Dekany 1 3 5 7 11	32	W. Carlos Harmonic

LEVIASYNTH PHRASES 1–16

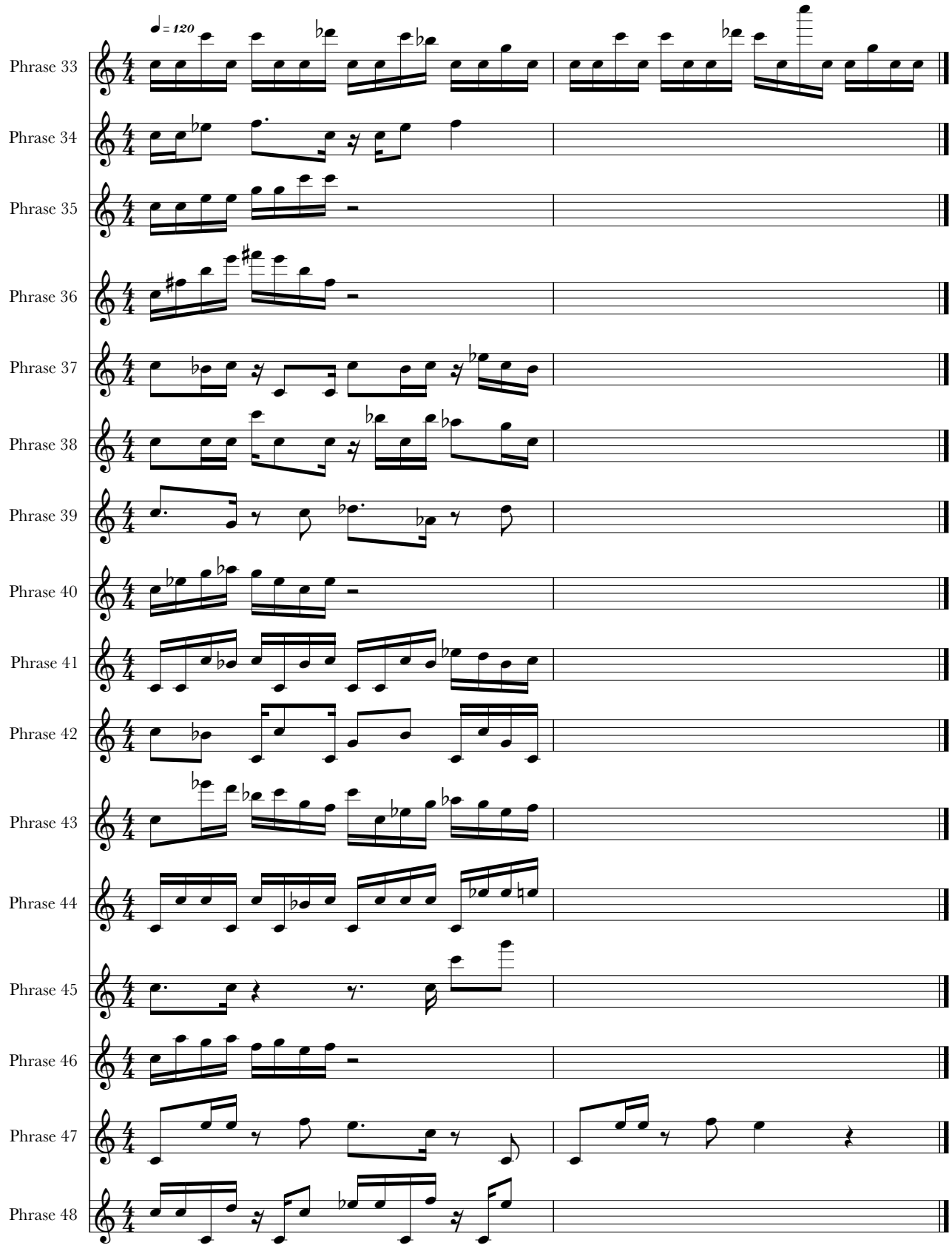
Ashun Sound Machines



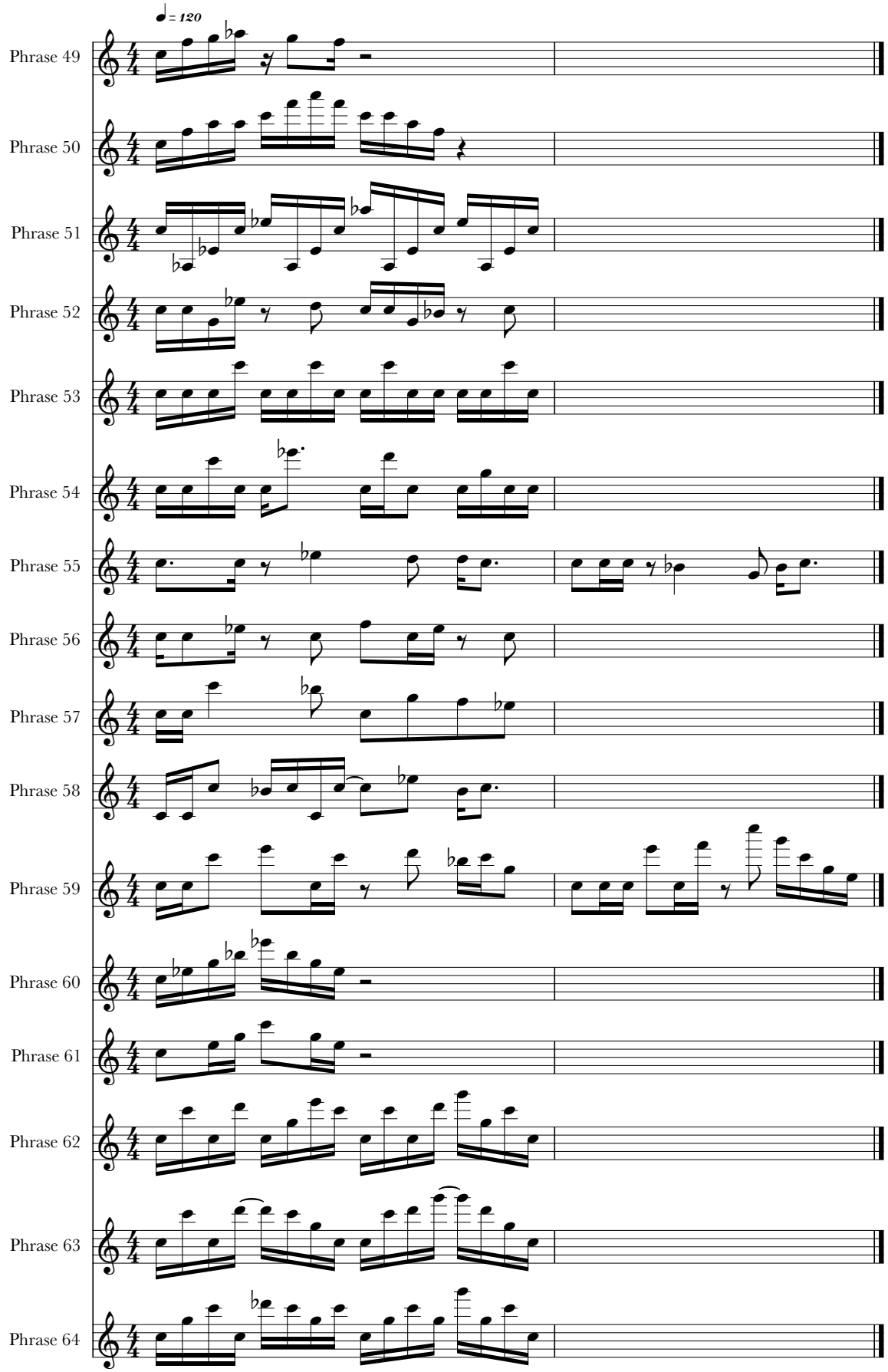
Ashun Sound Machines



Ashun Sound Machines



Ashun Sound Machines



SORTED BY CC NUMBER

Module	Parameter	CC
Global	Bank select MSB	0
Global	Modulation wheel	1
VCA	VCA Level	2
VCA	LFO 3 Amt	3
LFO 2	Level	4
Voice	Glide Time	5
	Reserved	6
Global	Master Volume	7
Multi Edit	Balance	8
Voice	Polyphony	9
Voice	Density	10
Global	Expression pedal	11
Pre-FX	Param1	12
Pre-FX	Param2	13
Delay	Feedback	14
Delay	Time	15
Macro	Macro 1 Value	16
Macro	Macro 2 Value	17
Macro	Macro 3 Value	18
Macro	Macro 4 Value	19
Macro	Macro 5 Value	20
Macro	Macro 6 Value	21
Macro	Macro 7 Value	22
Macro	Macro 8 Value	23
OSC 1	Initial Level	24
OSC 2	Initial Level	25
OSC 3	Initial Level	26
OSC 4	Initial Level	27
OSC 5	Initial Level	28
OSC 6	Initial Level	29
OSC 7	Initial Level	30
OSC 8	Initial Level	31
Global	Bank select LSB	32
OSC 1	Pitch	33
OSC 2	Pitch	34
OSC 3	Pitch	35
OSC 4	Pitch	36
OSC 5	Pitch	37
	Reserved	38
OSC 6	Pitch	39
OSC 7	Pitch	40
OSC 8	Pitch	41
OSC 1	Feedback	42
OSC 2	Feedback	43
OSC 3	Feedback	44
OSC 4	Feedback	45
OSC 5	Feedback	46
OSC 6	Feedback	47
OSC 7	Feedback	48
OSC 8	Feedback	49
Digital Filter	Morph	50
Digital Filter	Keytrack	51
Digital Filter	LFO 1 Amt	52
Digital Filter	Velocity > ENV	53
Digital Filter	ENV 1 Amt	54
Digital Filter	Cutoff	55
Digital Filter	Resonance	56
Analog Filter	Pre-Drive	57
Analog Filter	Keytrack	58
Analog Filter	LFO 2 Amt	59
Analog Filter	Velocity > ENV	60
Analog Filter	ENV 2 Amt	61
Delay	Feedback Tone	62
Delay	Wet Tone	63
Global	Sustain pedal	64
Voice	Glide (Toggle)	65
Reverb	Time	66
Reverb	Tone	67
Post-FX	Param1	68
Post-FX	Param2	69
LFO 1	Level	70
Analog Filter	Resonance	71
LFO 1	Rate	72
LFO 2	Rate	73
Analog Filter	Cutoff	74
LFO 3	Level	75
LFO 3	Rate	76
LFO 4	Level	77
LFO 4	Rate	78
LFO 5	Level	79
LFO 5	Rate	80
ENV 1	Attack	81
ENV 1	Decay	82

ENV 1	Sustain	83
ENV 1	Release	84
ENV 2	Attack	85
ENV 2	Decay	86
ENV 2	Sustain	87
ENV 2	Release	88
ENV 3	Attack	89
ENV 3	Decay	90
Reverb	Dry / Wet	91
Delay	Dry / Wet	92
Pre-FX	Dry / Wet	93
Post-FX	Dry / Wet	94
Voice	Detune	95
ENV 3	Sustain	96
ENV 3	Release	97
	Reserved	98
	Reserved	99
	Reserved	100
	Reserved	101
ENV 4	Attack	102
ENV 4	Decay	103
ENV 4	Sustain	104
ENV 4	Release	105
ENV5	Attack	106
ENV5	Decay	107
ENV5	Sustain	108
ENV5	Release	109
LFO 1	Waveform	110
LFO 2	Waveform	111
LFO 3	Waveform	112
LFO 4	Waveform	113
LFO 5	Waveform	114
	Reserved	115
	Reserved	116
	Reserved	117
	Reserved	118
	Reserved	119
	Reserved	120
	Reserved	121
	Reserved	122
Global	All notes off	123
	Reserved	124
	Reserved	125
	Reserved	126
	Reserved	127

SORTED BY MODULE

Module	Parameter	CC
Analog Filter	Pre-Drive	57
Analog Filter	Keytrack	58
Analog Filter	LFO 2 Amt	59
Analog Filter	Velocity > ENV	60
Analog Filter	ENV 2 Amt	61
Analog Filter	Resonance	71
Analog Filter	Cutoff	74
Delay	Feedback	14
Delay	Time	15
Delay	Feedback Tone	62
Delay	Wet Tone	63
Delay	Dry / Wet	92
Digital Filter	Morph	50
Digital Filter	Keytrack	51
Digital Filter	LFO 1 Amt	52
Digital Filter	Velocity > ENV	53
Digital Filter	ENV 1 Amt	54
Digital Filter	Cutoff	55
Digital Filter	Resonance	56
ENV 1	Attack	81
ENV 1	Decay	82
ENV 1	Sustain	83
ENV 1	Release	84
ENV 2	Attack	85
ENV 2	Decay	86
ENV 2	Sustain	87
ENV 2	Release	88
ENV 3	Attack	89
ENV 3	Decay	90
ENV 3	Sustain	96
ENV 3	Release	97
ENV 4	Attack	102
ENV 4	Decay	103
ENV 4	Sustain	104
ENV 4	Release	105
ENV5	Attack	106
ENV5	Decay	107
ENV5	Sustain	108
ENV5	Release	109
Global	Bank select MSB	0
Global	Modulation wheel	1
Global	Master Volume	7
Global	Expression pedal	11
Global	Bank select LSB	32
Global	Sustain pedal	64
Global	All notes off	123
LFO 1	Level	70
LFO 1	Rate	72
LFO 1	Waveform	110
LFO 2	Rate	73
LFO 2	Waveform	111
LFO 2	Level	4
LFO 3	Level	75
LFO 3	Rate	76
LFO 3	Waveform	112
LFO 4	Level	77
LFO 4	Rate	78
LFO 4	Waveform	113
LFO 5	Level	79
LFO 5	Rate	80
LFO 5	Waveform	114
Macro	Macro 1 Value	16
Macro	Macro 2 Value	17
Macro	Macro 3 Value	18
Macro	Macro 4 Value	19
Macro	Macro 5 Value	20
Macro	Macro 6 Value	21
Macro	Macro 7 Value	22
Macro	Macro 8 Value	23
Multi Edit	Balance	8
OSC 1	Initial Level	24
OSC 1	Pitch	33
OSC 1	Feedback	42
OSC 2	Initial Level	25
OSC 2	Pitch	34
OSC 2	Feedback	43
OSC 3	Initial Level	26
OSC 3	Pitch	35
OSC 3	Feedback	44
OSC 4	Initial Level	27
OSC 4	Pitch	36
OSC 4	Feedback	45
OSC 5	Initial Level	28
OSC 5	Pitch	37
OSC 5	Feedback	46

OSC 6	Initial Level	29
OSC 6	Pitch	39
OSC 6	Feedback	47
OSC 7	Initial Level	30
OSC 7	Pitch	40
OSC 7	Feedback	48
OSC 8	Initial Level	31
OSC 8	Pitch	41
OSC 8	Feedback	49
Post-FX	Param1	68
Post-FX	Param2	69
Post-FX	Dry / Wet	94
Pre-FX	Param1	12
Pre-FX	Param2	13
Pre-FX	Dry / Wet	93
Reverb	Time	66
Reverb	Tone	67
Reverb	Dry / Wet	91
VCA	VCA Level	2
VCA	LFO 3 Amt	3
Voice	Glide Time	5
Voice	Polyphony	9
Voice	Density	10
Voice	Glide (Toggle)	65
Voice	Detune	95
	Reserved	6
	Reserved	38
	Reserved	98
	Reserved	99
	Reserved	100
	Reserved	101
	Reserved	115
	Reserved	116
	Reserved	117
	Reserved	118
	Reserved	119
	Reserved	120
	Reserved	121
	Reserved	122
	Reserved	124
	Reserved	125
	Reserved	126
	Reserved	127

LEVIASYNTH SPECIFICATIONS

PHYSICAL

Dimensions: 44.2 x 26.7 x 9.15 cm (17.4 x 10.51 x 3.6 inches)

Weight: 4.75 kg (10.47 lbs)

CONNECTIONS: REAR PANEL

- MIDI In/Out/Thru
- USB type B port, class-compliant
- Stereo outputs (1/4", balanced)
- Sustain pedal input (polarity-sensing)
- Expression pedal input (reversible)
- Power: 12 V DC, ≥2A (Center: positive)
- Headphone connector
  - 6.35 mm (1⁄4 in)
  - Impedance: 16 – 75 Ohm

CONNECTIONS: TOP PANEL

CV inputs: Two (1/8" TS)

- Mod 1
- Mod 2

CV/Gate/Clock outputs: Five (1/8" TS)

- Pitch
- Gate
- Mod 1
- Mod 2
- Clock

Control Voltages

- Range: -5V to 10V
  - Pitch: + / - 99 cents
  - Mod: + / - 3.0V
- Standards: 1V / octave, 1.2V / octave, Hz/Volt

Gate Output

- Range: 3V, 5V, 10V
- Type: V-trig, S-trig

Clock Output

- Range: 3V, 5V, 10V
- Rates: 1 PPS, 2PPQ, 24 PPQ, 48PPQ
  - Offset: + / - 100ms
  - Division: 1/2x, 2x, 4x

DECLARATION OF CONFORMITY

USA

Important Notice:
DO NOT MODIFY THE UNIT!

This product, when installed as indicate in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Ashun Sound Machines could void your FCC authorization to use this product in the USA.

IMPORTANT: When connecting this product to accessories and/or another product, use only high-quality shielded cables. The cable(s) supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

NOTE: This product has been tested and found to comply with the limit for a Class B Digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide a reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and may radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause interferences harmful to the operation to other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference, which can be determined by turning the equipment off and on, please try to correct the interference by one or more of the following measures:

- Relocate either this product or the device that is affected by the interference.
- Use power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter(s).
- In the case of radio or TV interference, relocate and/or reorient the antenna. If the antenna lead-in is a 300 ohm ribbon lead, change the lead-in to the coaxial cable.
- If these corrective measures do not achieve satisfactory results, please consult the dealer or an experienced radio/TV technician for help.

The above statements apply ONLY to those products distributed in the USA.

CANADA

NOTICE: This class B digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

AVIS: Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EUROPE

CE

This product complies with the requirements of European Directive 89/336/EEC

This product may not work correctly as a result of electro-static discharge. If that happens, simply restart the product.